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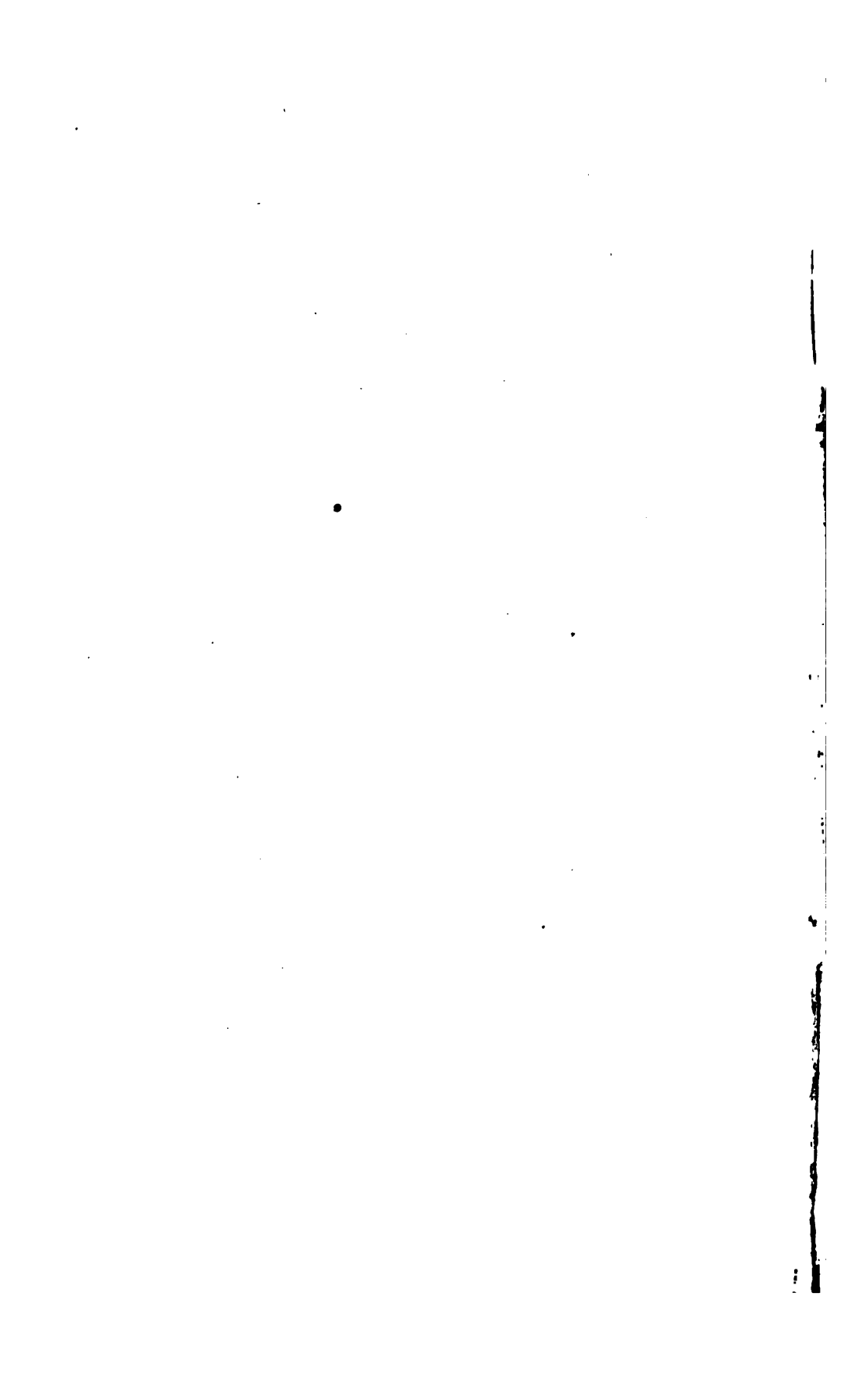


FROM THE FUND OF

CHARLES MINOT

Class of 1828





JOURNAL OF THE TRANSACTIONS
OF
THE VICTORIA INSTITUTE.

VOL. XXXIX.

© JOURNAL OF
THE TRANSACTIONS
OF
The Victoria Institute,
OR,
Philosophical Society of Great Britain.

EDITED BY THE SECRETARY.

VOL. XXXIX.



LONDON :

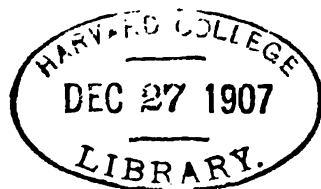
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LONDON:
HARRISON AND SONS. PRINTERS IN ORDINARY TO HIS MAJESTY,
ST. MARTIN'S LANE.

PREFACE.

DURING the period included in last session a committee was formed for investigating the financial position of the Institute, with a view to equalising the income and expenditure more nearly than at present. Owing to the excess of the latter over the former, the Council requested the Trustees to sell out a sum of £200 consols from the reserve fund, and this, owing to the low price of consols, only produced £198 3s. 7d. At the same time, in order to still further meet our obligations, an appeal was issued to Members and Associates, which up to the present has brought in the sum of £46 10s. 6d. I cannot suppose that this sum represents the extent to which our adherents are able and willing to help the Institute to maintain its position. Amongst the numerous appeals which are constantly being made to them for objects more or less worthy, it is probable that this appeal may have escaped the notice of many who would be willing to subscribe. A list of subscribers is appended to the Report, and is still open. Our main cause of expense is the heavy rent of our offices. Yet, their desirable and convenient situation, and their long association with the Institute, induces the Council to hesitate before removing to other offices less expensive but less eligible. Personally, your Secretary, whom the Committee kindly took into their counsels, feels the greatest disinclination to move to another office, and has offered to relinquish a considerable part of his salary in order to ease the financial situation. This proposal, however, the Council would not accept, and so the matter stands. It should be stated that during the examination of the accounts

the Finance Committee made full enquiry as to the possibility of reducing the expenditure on printing, amounting to £131 10s. 3d. for the past year. But, on comparing the estimates of Messrs. Harrison and Sons, who have for many years past been the firm employed by the Institute, with those of several other London firms, it was found that those of Messrs. Harrison and Sons were more favourable than those of their competitors, and it was resolved unanimously to retain their able and efficient services. From the above statement it will probably be allowed that there is no unnecessary expenditure in carrying on the work of the Society. What is required is an increase of funds, which may be obtained by an increase of Membership from those who are now Associates, and additional adherents from amongst those who approve of our objects, but have not yet seen their way to join our ranks.

EDWARD HULL, LL.D.,

Secretary and Editor.

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* * * *The Institute's object being to investigate, it must not be held to endorse the various views expressed at its meetings.*

ANNUAL GENERAL MEETING.

HELD IN THE ROOMS OF THE GEOLOGICAL SOCIETY,

ON WEDNESDAY, JULY 17TH, 1907.

THE EARL OF HALSBURY, M.A., D.C.L., F.R.S., PRESIDENT,
IN THE CHAIR.

The Report of the Council was then read by THE SECRETARY,
as follows :—

1. In presenting their FORTY-FIRST ANNUAL REPORT, the Council have pleasure in stating that there has been no falling off in interest regarding the work of the Institute, and as regards membership the inevitable vacancies caused by death and resignation have been very nearly filled by fresh accessions of Members and Associates.

2. The following statement will show the number of the adherents of the Institute at the end of May, 1907 :—

Life Members	...	...	...	37	in number.
Annual "	...	...	...	148	"
Life Associates	...	...	...	66	"
Annual Associates	...	...	...	422	"
Hon. Corresponding Members	...	...	...	174	"
Missionary Associates	...	...	...	4	"
Total				851	

As compared with the census of the previous year, there is a falling off in life members of five, and in annual members of three; on the other hand, there is an increase of six in life associates, and of three in annual associates, and the Council venture to state that considering the severe financial straits through which we have been passing, we have cause to be thankful that our position has been so well maintained.

3. The balance sheet to 31st December, 1906, has been duly audited, and as we entered the present year with a deficit of £206 6s. 6d., it was found necessary, much to the regret of the Council, to fall back upon the reserve fund in order to meet current liabilities and repay to the bank a loan of £100. The amount withdrawn was £230, which at the date of sale (April 15th last), owing to the depressed state of Consols, only realised £198 3s. 7d., leaving the amount of the reserve £770. In order to still further meet our obligations, a special appeal was made to members and associates, but the response was far from encouraging, the amount subscribed up to the end of the year being only £46 10s. 6d. This sum, however, added to the amount withdrawn from the reserve, has enabled us to meet all our obligations and retain in hand a substantial balance wherewith to meet future expenses.

4. The following is the new list of the Officers and Council:—

President.

The Right Honourable The Earl of Halsbury, M.A., D.C.L., F.R.S.

Vice-Presidents.

Sir T. Powell Buxton, Bart., K.C.M.G.
W. H. Hudleston, Esq., F.R.S., F.G.S.
Alexander McArthur, Esq., D.L., J.P.
David Howard, Esq., D.L., F.C.S.
Lieut.-General Sir H. L. Geary, K.C.B.
Right Hon. Lord Strathcona and Mount Royal, LL.D., F.G.S.

Honorary Correspondents.

The Right Hon. Lord Kelvin, Past P.R.S.	Professor A. H. Sayce, D.D., LL.D.
Professor A. Agassiz, D.C.L., F.R.S.	Professor Fridtjof Nansen, D.Sc.
Professor E. Naville (<i>Geneva</i>).	Professor Warren Upham.
Professor Maspero (<i>Paris</i>).	

Honorary Auditors.

J. Allen, Esq.	Lieut.-Col. Mackinlay, late R.A.
----------------	----------------------------------

Secretary and Editor of the Journal.

Professor Edward Hull, M.A., LL.D., F.R.S.

Council.

(In Order of Election.)

D. Howard, Esq., D.L., F.C.S., F.I.C., <i>f.c.</i> (<i>Trustee</i>).	Lieut.-Gen. Sir H. L. Geary, K.C.B., R.A.
Rev. Dr. F. W. Tremlett, D.D., D.C.L., Ph.D.	Edward Stanley M. Perowne, Esq., F.S.A.
Very Rev. Dean Wace, D.D. (<i>Trustee</i>).	Martin Luther Rouse, Esq., B.L.
Rev. Chancellor J. J. Lias, M.A.	Colonel T. Holbein Hendley, C.I.E.
Rev. Canon R. B. Girdlestone, M.A.	Arthur W. Sutton, Esq., F.L.S.
General Halliday.	Rt. Rev. Bishop J. E. C. Weldon, D.D.
Rev. John Tuckwell, M.B.A.S.	Professor H. Langhorne Orchard, M.A., B.Sc.
Lieut.-Colonel Mackinlay, late R.A.	Sydney T. Klein, Esq., M.B.I.
Theo. G. Pinches, Esq., LL.D., M.B.A.S.	Rev. Prebendary H. E. Fox, M.A.
Ven. Archdeacon W. M. Sinclair, M.A., D.D.	Colonel C. E. Yate, C.S.I., C.M.G.
Commander G. P. Heath, R.N.	W. E. Thompson Sharpe, Esq.
Rev. G. F. Whidborne, M.A., F.G.S., F.R.G.S.	William J. Horner, Esq.

MEMBERSHIP.

The Annual Subscription for Members is two guineas, and for Associates, one guinea. There is no entrance fee and both receive the *Journal* post free.

5. *Obituary.*

The Council have to deplore the loss by death of many supporters, including several distinguished members, amongst whom may be specially named His Excellency Count Bernstorff, formerly ambassador to this country from the German Empire, and greatly esteemed for his piety and nobility of character, also:—

The Right Rev. Bishop Bompas, D.D., Archdeacon J. I. Brooke, Edward Chapman, M.A., John G. Cribb, R. J. Finnemore, J.P., Samuel Finley, Rev. G. Grenfell, F.R.G.S., J. G. Langham, Rev. A. C. Macpherson, M.A., Rev. J. McWilliam, James S. Napier, Rev. J. Rate, M.A., Horace J. Smith-Bosanquet, J.P., D.L., Ven. Archdeacon W. F. Taylor, D.D., J. E. Vanner, Alfred J. Woodhouse, L.D.S., Richard Wood, J.P., Rev. Prebendary Rogers, Rev. Professor S. L. Bowman, M.A., D.D., author of an important work on the Historical Evidences of the New Testament—and R. Denny Umlin, B.L.

6. MEETINGS.

The subjects treated at the ordinary meetings during the past session may be arranged under the following heads:—

1. BIBLICAL.

1. "The Scriptural Idea of Miracles." By Rev. Canon GIRDLESTONE, M.A.
2. "The Pedigree of the Nations." No. II. By M. L. ROUSE, Esq., B.L.

2. GEOGRAPHICAL.

1. "Orissa: its History and People." By CHARLES W. ODLING, Esq., C.S.I.
2. "Exploration of Asia Minor as bearing on New Testament History." By Professor Sir WILLIAM M. RAMSAY, LL.D.
3. "Recent Discoveries in Palestine and Syria." By Dr. E. W. GURNEY MASTERMAN, F.R.G.S.

3. GEOLOGICAL AND PHYSICAL.

1. "The San Francisco and Valparaiso Earthquakes and their Causes." By Dr. WARREN UPHAM, M.A., F.G.S.
2. "The Spread of the European Fauna." By Professor J. LOGAN LOBLEY, F.G.S., F.R.G.S.
3. "Plant Distribution from an Old Standpoint." By Dr. H. B. GUPPY, F.R.S.E.

4. HISTORICAL.

1. Review of Professor Flinders Petrie's recent work on "Sinai." By the SECRETARY.
2. "Survivals of Primitive Religions among the People of Asia Minor." By Rev. G. E. WHITE, Dean of Anatolia College.
3. "Mencius." By Rev. F. STORRS TURNER, B.A.

7. *The Journal of Transactions.*

The thirty-eighth volume of the *Journal of Transactions*, like its predecessor, has been circulated in many lands, especially in the United States of America, where we have a large number of warm supporters. As an example of this feeling of sympathy with the objects of the Institute the following is an extract from a letter to the Secretary by Dr. George H. Martin of San Francisco, who has recently joined the Institute as a member; it is dated February 16th, 1907:—

"I am thoroughly in sympathy with the objects of the Institute, and have known of its good work for many years." It was an agreeable surprise to receive this statement from a city which had recently undergone such terrible vicissitudes.

As stated in the last report we have several public libraries which subscribe for the Volumes under the head of "Associate Libraries." Of persons in foreign countries connected with our Society, about 79 belong to the United States of America, 43 to India, 14 to Australia, 13 to Canada, and about the same number to New Zealand and South Africa, and one (Public Library) to Bermuda.

8. *Missionary Associates.*

At the Meeting of Council, held on the 21st January last, a resolution was unanimously adopted granting the privilege of associateship to missionaries at half the usual subscription, namely half-a-guinea, and the Secretary was instructed to take the necessary steps for carrying out this resolution, and circulars were issued to the leading missionary societies in London. It will require time in order to ascertain to what extent this privilege will be made use of.

9. *Conclusion.*

While humbly desiring the continued blessing of Almighty God, and the support of its members, the Council wishes to

express its thanks to the contributors of papers, which are being offered in increasing numbers, and to press upon its friends the duty of doing what in them lies to increase the membership and extend the usefulness of the Institute.

Signed on behalf of the Council,

HALSBURY,

President.

Donations in answer to the Financial Appeal.

					£	s.	d.
Paid in 1906.	{	Lt.-Colonel G. Mackinlay ...	...	...	2	2	0
		J. A. Strong, Esq. ...	...	...	2	2	0
		Rev. T. M. B. Paterson ...	...	...	1	1	0
		Anon. ...	...	...	1	1	0
		S. Joshua Cooper, Esq. ...	...	...	10	0	0
		Dr. Walter Kidd ...	...	...	1	1	0
		Prof. E. Hull... ..	...	...	10	0	0
		Miss Loveday ...	...	...	0	5	0
		Rev. G. F. Whidborne ...	...	...	5	0	0
		Miss E. H. Bolton ...	...	...	1	0	0
		Rt. Rev. Bishop Tuttle ...	...	...	1	0	6
		Lt.-Genera Sir H. Geary, K.C.B....	...	...	2	2	0
1907.	{	E. Molony Esq. ...	...	...	5	0	0
		M. L. Rouse, Esq., B.L. ...	...	...	1	1	0
		Arthur Jessop, Esq....	...	...	1	1	0
		Rev Richard Adams, M.A. ...	...	...	0	4	0
		Rt. Rev. Bishop Evington, D.D. ...	...	...	2	0	0
		C. W. Odling, Esq., C.S.I. ...	...	...	0	10	0
					£46	10	6

BALANCE SHEET, year ending December 31st, 1906.

RECEIPTS.				EXPENDITURE.			
	£	s.	d.	£	s.	d.	
Balance from 1905 ..	18	18	0	Printing ..	..	..	131 10 3
Subscriptions :—1 Life Member ..	2	2	0	Postage ..	..	..	35 13 7
1 Member, 1903 ..	4	4	0	Binding ..	..	..	45 10 3
2 Members, 1904 ..	8	8	0	Reporting ..	..	..	17 10 0
4 " 1905..	231	0	0	Stationery ..	..	..	12 5 5
110 " 1906..	14	14	0	Expenses of Meetings	..	..	18 3 1
7 " 1907..	7	7	0	Clerk—Salary ..	..	..	118 1 0
7 Associates, 1904 ..	12	12	0	" Insurance ..	..	..	2 11 4
12 " 1905 ..	264	12	0	Rent.. ..	..	..	180 0 0
252 " 1906 ..	15	15	0	Housekeeper ..	..	..	0 14 0
15 " 1907 ..	579	12	0	Coal and Light ..	..	..	6 12 10
Sales ..	..	..	..	Library ..	..	..	9 2 2
Dividends on £1,000 2½ p.c. Consols	..	..	..	Secretary ..	..	..	200 0 0
Donations (Special Appeal) ..	..	..	..	Fire Insurance ..	..	..	10 0 0
Loan from Bankers ..	..	..	..	Bank Charges ..	..	..	0 12 0
Balance debtor Bills owing £225 Os. 9d., less cash in	..	..	..	Interest of Loan ..	..	..	0 9 9
hand £18 14s. 3d. ..	..	..	..	Sundries ..	..	..	1 1 5
				Unpaid Bills ..	..	..	3 12 6
				Cheque U.S. paid 1907 ..	..	..	225 0 9
							1 0 6
							<u>£1,019 10 10</u>

There is a Capital sum of £1,000 2½ Consols, also the Capital of the Gunning Trust Fund, £508 Great India Stock.

GUNNING PRIZE FUND.		£	s.	d.
Balance Credit from 1905 ..	..	..	6	7 7
1906, Jan. 4th. Interest ..	..	..	12	18 2
1906, July 4th. " ..	..	..	7	4 9
Balance Credit ..	..	..	<u>26</u>	<u>10 6</u>

We have examined the Balance Sheet with the Books and Vouchers and find it correct.

May 24th, 1907.

JOHN ALLEN, }
W. J. HORNER, } *Auditors.*

THE ANNUAL ADDRESS.

*THE DEVELOPMENT OF THE RELIGIOUS
FACULTY IN MAN, APART FROM REVELA-
TION.* By the Rt. Rev. Bishop Wilson, D.D.

This paper has not been finally corrected by the author.

desire to preface it by two or three explanatory remarks.

1. Whatever be the way in which man came into the world, whether by an immediate act of the Creator or by evolution from a lower species, it is evident that there must have been a first man, in other words, there was at some point of the world's history a being who first deserved the name of man. It is perhaps a difficulty in the way of the modern doctrine of man's descent from some lower animal that the beings immediately next to him in the evolutionary scale should be either non-existent or far less numerous than such beings as are infinitely below him. But if there was, as there must have been, a first man, then the nature of man stands by itself; it is what it has been experimentally proved to be, and it must not be limited by any such standard as may be applicable to the nature of lower beings.

2. History proves the spiritual element in man. To deny it is wholly to misconceive human nature. It may be admitted that the spiritual part of man's nature, like other parts, has at times become distorted, that is, it has tended to such results

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BALANCE SHEET, year

	£	s.	d.
Balance from 1905 ..	18	18	0
Subscriptions:—1 Life Member ..	2	2	0
1 Member, 1903 ..	4	4	0
2 Members, 1904 ..	8	8	0
4 " 1905..	23	0	0
110 " 1906..	14	14	0
7 " 1907..	7	7	0
7 Associates, 1904 ..	12	12	0
12 " 1905 ..	26	12	0
252 " 1906 ..	15	15	0
15 " 1907 ..	579	12	0
Sales ..	64	18	5
Dividends on £1,000 2½ p.c. Consols	23	15	0
Donations (Special Appeal)	36	14	6
Loan from Bankers	100	0	0
Balance debtor Bills owing £225 Or. 9d., less cash in hand £118 14s. 3d.	206	6	6

**There is a Capital sum of £1,000 2½ Consols, also the Capital of tl
GUNNING**

Balance Credit from 1905
1906, Jan. 4th. Interest
1906, July 4th. "

Balance Cr

**We have examined the Balance Sheet with the Books and V
May 24th, 1907.**

st, 1906.

EXPENDITURE.	£	s.	d.
..	131	10	3
..	35	13	7
..	45	10	3
..	17	10	0
..	12	5	5
..	18	3	1
..	118	1	0
..	2	11	4
..	180	0	0
..	0	14	0
..	6	12	10
..	9	2	2
..	200	0	0
..	10	0	0
..	0	12	0
..	0	9	9
..	1	1	5
..	3	12	6
..	225	0	9
..	1	0	6
..	21,019	10	10

Treat India Stock.

JOHN ALLEN,
W. J. HORNER, } *Auditors.*

THE ANNUAL ADDRESS.

THE DEVELOPMENT OF THE RELIGIOUS FACULTY IN MAN, APART FROM REVELATION. By the Rt. Rev. Bishop WELLDON, D.D.

THE object of my paper is to show how man was historically prepared, as it seems, for the reception of the spiritual truths committed to his reason, and his conscience by God. For however the nature of revelation may be conceived, it depends not only upon the will of God to reveal Himself to man, but upon man's capacity for accepting what is so revealed. But as this paper necessarily lies somewhat apart from the ordinary lines of Christian Apologetics and indeed of the relation between Christian faith and Scientific Discovery or Theory, I desire to preface it by two or three explanatory remarks.

1. Whatever be the way in which man came into the world, whether by an immediate act of the Creator or by evolution from a lower species, it is evident that there must have been a first man, in other words, there was at some point of the world's history a being who first deserved the name of man. It is perhaps a difficulty in the way of the modern doctrine of man's descent from some lower animal that the beings immediately next to him in the evolutionary scale should be either non-existent or far less numerous than such beings as are infinitely below him. But if there was, as there must have been, a first man, then the nature of man stands by itself; it is what it has been experimentally proved to be, and it must not be limited by any such standard as may be applicable to the nature of lower beings.

2. History proves the spiritual element in man. To deny it is wholly to misconceive human nature. It may be admitted that the spiritual part of man's nature, like other parts, has at times become distorted, that is, it has tended to such results

as were injurious to man himself. But it remains an essential factor of his being. Man is akin to God; he aspires to spiritual knowledge and felicity, and his religious history in all the ages is one long effort to attain the satisfaction of his spiritual nature.

3. There is no other means of satisfying man's spirituality than by revelation. All mere secular truth he may slowly but surely discover for himself. But the truths of God's being and character, of heaven and hell, of immortality, of eternal life, he can learn, if he learns them at all, only by direct communication from God. These truths and others like them, vitally important as they are to him, he cannot know unless God himself reveals them.

Assuming, then, the existence of a beneficent Deity, I perceive no intrinsic difficulty in revelation. Rather it seems to me to be such a communication as I should expect God to make to man for human good; and with all my heart I believe that God has "at sundry times and in divers manners" revealed Himself through chosen agents to humanity.

All that I propose to do in this paper is to enquire how man, by using his own natural powers, was disposed to apprehend and embrace the revelation which it was God's will to make.

When man began to think at all, he began by thinking about himself. He was chiefly concerned with himself, chiefly interested in himself; it was only natural that he should judge everybody and everything outside himself by his own nature. The old saying, *ἄνθρωπος μέτρον παντων* contains a deep psychological truth. Man cannot escape from himself. Consciously or unconsciously he refers all phenomena to himself. Even his deities, as Aristotle* has observed, he creates in his own image.

But as soon as man reflected, in however a rudimentary manner, upon himself, he became conscious of a dualism in his own nature. To say that in early times he conceived himself, intelligently and scientifically, as a being composed of two distinct elements,

* *ὡς περ καὶ τὰ ἔιδη ἑαυτοῖς ἀφομοιῶν οἱ ἄνθρωποι, οὕτω καὶ τοὺς θεοὺς τῶν θεῶν*, Polit., i, 2, 7.

his body and soul, would be to antedate what has been a subsequent result of self-introspection. But it must have occurred to him, almost in the birthday of human thought, that his nature was not single but composite. He realised, however faintly at first, that there was in his nature one part which issued commands and another part which obeyed them. He realised, too, that there was in his nature not only his material body, but something else that was different from the body, something immaterial, impalpable, invisible. For it was evident that he himself was not always the same, that there are times when his being seemed to live and act as a single whole, and other times when one part of his being seemed to be present, and the other part to be temporarily divorced from it.

Among the experiences which conferred upon his mind the essential dualism of his nature, it is probable that the contrast between waking and sleeping was powerful as it was natural. For the greater part of his life he is conscious, intelligent, active, energetic; he sees, he feels, he thinks, he converses and others converse with him; he is occupied in eating and drinking and in the regular avocations and pleasures of his nature; he exercises the power of will and enjoys the satisfaction of gratifying it, and suffers the pain of finding it disappointed and defeated. But for the lesser part he is as one living though without life; he is feeble as a babe; he lies at the mercy of circumstances; he is bereft of consciousness, character and judgment; he is little more than a dull brute, quite inert, insensible of all that passes before his closed eyes, and impotent to defend himself against the assault of man or beast.

This attitude of strenuousness and helplessness is man's personal daily experience; and it was inevitable that primitive man should reflect upon it. What account of it could he render to himself? He could scarcely, I think, avoid the inference that something, which existed and was active within him during his waking hours, passed out of him for a while, when he fell asleep—that something he called his soul or his spirit. But there was a further question that must have suggested itself to primitive man: If the spirit departs from the body during sleep, what becomes of it? The body remains,

although apparently helpless and lifeless; but where is the spirit? Upon this interesting problem the savage imagines that light is shed by the experience of dreams. In a dream the spirit appears to quit the body and to become independent of all corporeal limitation; to enter a new world, to participate in a new existence, to emancipate itself from the conditions of time and space, to hear strange voices, and to see unwonted sights such as are impossible to it and inconceivable in its waking hours; to consort freely with friends and kinsmen, with strangers and enemies, and not less freely with the dead than with the living; and to realize sensations of joy and sorrow, delight and disappointment, hope, fear, anticipation and failure, in which the body neither claims nor is capable of claiming any part. And the savage argues that, if this is so, then the spirit has actually been where it has seemed to be, and has actually done what it has seemed to do, has actually suffered what it has seemed to suffer; in other words, that it has lived for a time a life of its own, apart from the body.

Modern anthropologists have often insisted upon the vital part played by dreams in the origin of religion. "The ideas of religion," says Lord Avebury,* "among the lower races of man are intimately associated with, if they have not originated from, the condition of man during sleep, and especially from dreams."

Dreams have been commonly held, in the judgment of primitive peoples, to attest the reality of spiritual beings external to man; but they afford still stronger testimony, in that same judgment, to the reality of the life which the spirit lives independently of the body. For dreams would be no less impressive upon the minds of savages in the infancy of human experience than they are now upon the minds of children; it would be impossible to shake off the consciousness of their usual constant effect, and the imaginations of dreamland would constantly tend to become more and more the realities of the primitive world.

But sleep is not the only phenomenon which would suggest to

* *Origin of Civilization*, ch. 6, p. 225.

untutored minds the separate existence of the spirit. Sleep, it is true, occupies a unique place in human experience, owing to the regularity of its occurrence among all men; whatever evidence of the nature or action of the human spirit was derivable from sleep would be universally apprehended and understood. Nor would any man, in recounting the history of his dreams, fail of an actual or a probable response in the positive experience of his fellow men. But there are other phenomena which would equally demand an explanation, although they are not, like sleep, habitual and universal, and would equally find it in the dualism of human nature. It is probable that a state of trance or insensibility would happen to man more frequently in primitive than in civilised society. His ignorance of the laws of nature, his emotional excitability, his misuse of powerful intoxicating drugs would occasion it. But whether it was common or rare, the savage, who saw that a body, which a moment before had been sensitive and vigorous, was reduced to a condition of torpor, would jump to the inference that it had been deserted by the spirit which gave it life; he would immediately conclude that the spirit had gone out of it, and that, unless and until the spirit returned to it, it would not revive. Every swoon would become a witness to the spirit's existence as independent of the body. And as in a case of swooning no less than of sleep, the man would after a time recover consciousness, it would be assumed that his spirit had returned to him. The word "ecstasy," by its derivation, poetically suggests what would to savage minds appear as literal or actual fact. Two other cases, at least, there are in which the thought of the temporary or permanent divorce of the human spirit from the body would not unnaturally recommend itself to primitive minds.

One is that of illness. If the savage had advanced so far in speculation as to associate the loss of consciousness or energy with a severance, however it might be brought about, between spirit or body, how would he logically argue about the slow and sure fading of human strength under the pressure of disease? Would it not be to him a natural conception that, as the strength ceased, so the spirit or soul, in which the life resided,

was gradually ebbing away, until at last it wholly left the body at death.

The other case is that of lunacy. It is still the fashion to speak of a madman as being "beside himself," or "not himself," or "out of his mind," or "out of his senses," and these expressions are so many evidences of the conviction that he has lost something which ought to be his, and which is indeed himself, but has departed from him. This conviction accounts equally for the respect and the contempt shown in different lands and at different periods of history for lunatics or idiots.

It is probable, too, that the contemplation of bodily or mental disease, as implying the departure of the spirit which is in man, from its corporeal dwelling place, would suggest the possibility of the spirit quitting the body, if only for a brief space, under certain conditions without any visible loss of physical or mental power. Spiritual or, as they are now called, telepathic, appearances were not unknown to primitive man. His wild fancy would soon exaggerate and multiply them. And if such appearances took place and were held to be not infrequent, it would be agreeable to his rude fancy of the universe that they should be ascribed to the temporary emancipation of the soul from the body.

There remains death, the most striking and solemn of human phenomena.* It is not difficult to see how primitive man would regard death. The comparison of death to sleep is an old favourite poetical fancy. Homer's "Ἵπνος κασίγνητος θάνατος," Virgil's† "Consanguineus leti sopor," Shelley's‡ "Death and his brother sleep," are all familiar illustrations of this fancy. But a poetical metaphor is to primitive man a literal truth; and as in sleep, so too in death he would believe that the spirit, being set free from the body, entered upon a new and independent life. He would think of it as enjoying new experiences. He would anticipate its return, and when he discovered that the body, instead of being reanimated by the spirit, began to moulder away, he would conclude that the spirit had finally abandoned it.

* *Iliad*, xiv, p. 231.

† *Æneid*, vi, p. 278.

‡ "Queen Mab," l.

But the departure of the spirit from the body could not, and would not be, in his eyes the death of the spirit; rather would it be emancipation of the spirit. It would set the spirit free from restrictions which had curbed and confined its activity. Primitive man then would let his imagination run riot upon the incorporeal life of the spirit. He would ascribe to it fresh powers, faculties, emotions, experiences; nor would it be a matter of surprise to him, especially if his view of spiritual existence were still more or less sensuous, that the spirit should at certain times and under certain conditions present itself objectively to human eyes in the hours of waking as well as of sleep. The belief in spirits is almost an axiom of primitive thought. "Materialism," it has been well said,* "is one of the latest products of the human mind; spiritualism one of the earliest."

So far, I have argued that religion, being the conscious expression of the relation existing between the human spirit, and a spiritual power or powers outside itself, striking its roots down in man's apprehension of the essential dualism which characterises his own nature. It is now time to inquire what is the witness of ethnography and anthropology to the theory that has been put forward as to the supposed absence of the spirit from the body under certain conditions of human life.

Let me begin with the phenomenon of sleep. "It is a common rule with primitive people," says Mr. Frazer,† "not to waken a sleeper, because his soul is away and might not have time to get back; so if the man was awakened without his soul, he would fall sick. If it is absolutely necessary to waken a sleeper, it must be done very gradually, to allow the soul time to return." He gives, as other anthropologists have given, much interesting evidence of this superstition.

The dread of being suddenly awakened, or of suddenly awakening anybody out of sleep, has been recorded as character-

* Lord Avebury, *Origin of Civilization*, ch. 2, p. 295.

† *Golden Bough*, vol. i, ch. 2, p. 127.

istic of the Fijians,* the Malaysans,† the Burmese,‡ the natives of Luzon§ in the Philippine Islands, of the Indians of Manilla,|| and of the Timorese.¶

But in sleep there are other dangers which superstitious fancy discovers besides that of a sudden awakening. The following instructive passage relates to the supposed evil consequences of practical joking upon sleepers, according to a belief current on the Bombay Presidency. "It is a most reprehensible thing and equivalent to murder to play practical jokes on sleeping persons, so as to change their appearance, i.e., to paint the face in fantastic colours or to give moustachios to a sleeping woman. The reason is this: Whenever anyone sleeps, the soul leaves the body and roams abroad, and returns at the awakening: if therefore the soul can't find its own proper body on its return, it remains away altogether, leaving the body a corpse."**

It may be noticed that in some countries, as in Burma†† or Persia,‡‡ the soul is imagined to issue from the body in the form of a butterfly.

Of the belief that the soul or spirit during its absence from the body in sleep, and especially in dreams, is subject to many curious actual experiences it is possible to draw evidence from several quarters.

Thus the Greenlanders§§ hold that the soul amuses itself at night in hunting, dancing and paying visits. The New Zealanders,||| or some at least of the aboriginal inhabitants of

* T. Williams, *Fiji and the Fijians*, ch. 6, p. 138.

† Tylor, *Anthropology*, ch. 14, p. 344.

‡ Shway Yeo, *The Burman, his Life and Notions*, vol. ii, ch. 11, p. 103. He remarks that in consequence of this superstition "it is useless to tell a Burman servant to wake you at a certain hour."

§ Jagor on the "Natives of Naga in Luzon," *Journal of the Ethnological Society*, vol. ii, p. 175.

|| Bastian, *Der Mensch*, vol. ii, p. 319.

¶ Riedel, "Die Landschaft Dawan oder West-Timor," *Deutsche Geographische Blätter*, vol. x, p. 280.

** *Punjab Notes and Queries*, vol. iii, No. 530.

†† Shway Yeo, *The Burman, his Life and Notions*, vol. ii, ch. 11, p. 103.

‡‡ Ralston, *Songs of the Russian People*, p. 117.

§§ Cranz, *Grönland*, p. 257; cf. Bastian, *Der Mensch*, vol. ii, p. 318.

||| R. Taylor, *Te Ika a Maui; or, New Zealand and its Inhabitants*, ch. 5, p. 74; ch. 12, p. 160.

New Zealand, hold that a man's soul can travel in dreams beyond the limits of the earth to the regions of the dead, and can enter into conversation there with his departed kinsmen and friends.

The Fijians* hold that the spirit of a man, while he is still alive, can quit his body during sleep to inflict trouble or suffering upon his enemies. It is a reasonable supposition, as I have already urged, that, if primitive man looked upon the temporary departure of the spirit from the body as the theory naturally accounting for the phenomena of sleep and dreams, he would give the same account of such an event as a trance or a swoon. For unconsciousness is a feature of one case as of the other; and the reason of unconsciousness, as he supposes, is that the soul for the time being has left the body. And here the testimony of travellers and explorers confirms the supposition.

According to Schürmann,† for example, the word for "soul or spirit" in the Parukalla language is *wilya*. But the word for "unconscious" is *wilya marraba*, which means "without soul" or "without spirit." Keating‡ relates that in the belief of the Chippewa Indians, the soul, when it leaves the body, makes its way to a stream which it must cross on the back of a large snake. "Some souls come to the edge of the stream, but are prevented from passing by the snake that threatens to devour them; these are the souls of persons in a lethargy or trance." Williams§ is the authority for the extraordinary statement that in Fiji "when anyone faints or dies, their spirit, it is said, may sometimes be brought back by calling after it; and occasionally the ludicrous scene is witnessed of a stout man lying at full length and bawling out lustily for the return of his own soul." Not less ample is the evidence for the primitive view of physical or mental disease as caused by the temporary departure of the soul from the body.

* T. Williams, *Fiji and the Fijians*, vol. i, ch. 7, p. 204.

† *Vocabulary of the Parukalla Language*, pp. 72, 73. The Parukalla language is described as "spoken by the natives inhabiting the western shores of Spencer's Gulf in South Australia."

‡ *Expedition to the Sources of St. Peter's River*, vol. ii, ch. 3, p. 154.

§ *Fiji and the Fijians*, ch. 7, p. 204.

The Burmese, for example, imagine, when a person falls ill, either that his *leyp-bya* (i.e., his soul in the form of a butterfly) has been scared by an evil spirit out of his body, or that after being so scared, it has hurried back with such precipitancy as to disorganise his constitution.* The Mongols explain bodily sickness in various ways, but the popular explanation among them seems to be that the soul has gone out of the body and is unable or unwilling to return to it. "To secure the return of the soul it is therefore necessary on the one hand to make its body as attractive as possible, and on the other hand to show it the way home. To make the body attractive all the sick man's best clothes and most valued possessions are placed beside him, he is washed, incensed, and made as comfortable as possible, and all his friends march thrice round the hut, calling out the sick man's name and coaxing his soul to return. To help the soul to find its way back a coloured cord is stretched from the patient's head to the door of the hut. The priest in his robes reads a list of the horrors of hell and the dangers incurred by souls which wilfully absent themselves from their bodies. Then turning to the assembled friends and the patient he asks, 'Is it come?' All answer, 'Yes,' and bowing to the returning soul throws seed over the sick man. The cord which guided the soul back is then rolled up and placed round the patient's neck, who must wear it for seven days without taking it off. None may frighten or hurt him, lest his soul, not yet familiar with its body, should again take flight."†

And as with physical so it was also with mental disease. That, too, was attributed to a severance between spirit and body. Thus it is recorded that the negroes of North Guinea habitually ascribed imbecility or lunacy to the premature flight of the soul from its bodily tenement.‡ Nor is the evidence less strong or striking as to the savage mode of looking upon death. Thus the Malays believe that the soul of a dying man escapes through his

* Shway Yeo, *The Burman, His Life and Notions*, vol. ii, p. 101.

† Frazer, *Golden Bough*, vol. i, ch. 2, p. 128. His description is based upon Bastian, *Die Seele und Ihre Erscheinungswesen im der Ethnographie*, p. 36.

‡ J. L. Wilson, *West Africa*, p. 220.

nostrils. The Chinese make a hole in the roof of the house where a person lies dying to let out his soul. The custom of opening a door or a window for the departing soul when it quits the body is not yet wholly abandoned among the common people in France or Germany or England.* To quote the opinion of a careful observer†: "It is, or rather was, believed in nearly every part of the West of England that death is retarded, and the dying kept in a state of suffering, by having any lock closed, or any bolt shot in the dwelling of the dying person."

What became of the spirit after its severance from the body was in early times, as it has ever been, a matter of difference, if not of dispute. But it was natural to suppose that the disembodied spirit would linger, at least for a while, in the neighbourhood of the dead body which it had left. Accordingly, the Iroquois Indians were, or perhaps are, wont to bore holes in the coffin or to leave an opening in the grave that the spirit or soul might revisit the body. It is the same idea, half unconsciously entertained, which has at all times marked out churchyards as the natural lurking places of departed spirits or ghosts.

But not to multiply quotations or references, which are easily accessible, it seems that the first step which primitive man took or could well take towards the origination of an elementary religion, faith and practice, lay in the apprehension, however dim and faint it might be, of his own dualism. He realised that there were two constituent parts of his nature, body and spirit, and that the spirit could live and act without the body, whereas the body without the spirit was dead. He inferred therefore the superiority of the spirit to the body, and as he surveyed the face of Nature, he was prepared and inclined to discern everywhere traces of the same spiritual energy as he was conscious of in himself. Let me try to follow the process of his reasoning,

The spirit is the source of life in man. Theoretically it was localised by primitive thought in various parts of the

* Tylor, *Primitive Culture*, vol. i, p. 454.

† Hart, *Popular Romances of the West of England*, p. 379.

human body—in the blood, or the heart, or the pupil of the eye, or, as seems most natural, in the breath. But whatever the assumed locality of the spirit might be, its presence meant life, and its departure meant death.

But life is not the attribute of man alone in Nature. There is life everywhere—motion, energy, force, vitality, not in the lower animals only, but in the wind, the sea, the flowing streams, the echoing waterfalls, the thunder, the lightning, the tremulous forest, the growing crops, the gathering dawn, the lengthening shadows of nightfall; and wherever there was life—so primitive man would argue—there was spirit.

What could be more natural than that he should imagine a spiritual force—a spiritual Being—as associated with, and actually resident in, the various objects of the natural world? Greek mythology itself recognised, almost instinctively, such deities as the Dryades, or spirits of the trees; the Naiades, or spirits of the waters, the Hyades, or spirits of the rain-clouds. It spoke not of the sky only but of Ouranos, nor of the ocean but of Poseidon, nor of the sun but of Apollo, nor of the fire but of Hephaistos, nor of the earth, but of Demeter.

It is perhaps in the instance of the thunder that the anthropomorphism of primitive theology reveals itself most clearly: for to savage minds the thunder could scarcely appear anything else than the voice of a living superhuman Person. Accordingly the thunder-god is a deity known to all or nearly all early mythologies.

The Iroquois believe in the god Heno, who rides through the heavens on the clouds, and splits the trees of the forest with the bolts which he hurls at his enemies. The Yorubas call the same god Shango; he it is who with his thunder-clap and lightning flash casts down upon the earth, according to their fancy, the rude stone celts which they dig up out of the soil and call his axes. Among the Araucanians of Chili, he is known as Dillar; and to him as the thunder-god they pray for victory, before forming battle, and render thanks when the victory is won.

This half-unconscious spiritualisation of natural phenomena is the germ of such worship as is frequently, but not correctly,

held to be idolatrous. It is not to the natural object but to the spirit residing within it, that the worship is paid. "In modern times," says Mr. Tylor,* "it is among the negroes of the New Guinea coast that the clearest idea of the sea-god is to be found when the native kings, praying him not to be boisterous, would have rice and cloth, and bottles of rum, and even slaves, cast into the sea as sacrifices." The modern Parsi worships not the sun but the Sun-god, as the ancient Egyptians worshipped Ra. Traces of such sun-worship are not wanting in the Old Testament;† it was one of the forces constantly threatening the pure monotheism of Israel.

From the sun and the ocean, from the thunder and the lightning, and such other powerful and impressive natural forces, the conception of spirits, innate and inherent in natural objects, came to be spread over the whole face of Nature. But it was always the spirit of the object and not the object which was worshipped. Thus Waitz‡ makes the following remark: "A negro who paid honour and offered food to a tree was told that the tree did not eat anything; he defended himself against the criticism by replying, 'Oh! it is not the tree which is fetish; the fetish is a spirit which is invisible, but he has incorporated himself in this tree. It is true that he cannot consume our material foods, but he enjoys the spiritual part of them, and leaves behind the material part which we see.'"

But the "omnipresent religions and personal interpretation of Nature," as Grote§ calls it, so natural to primitive man, soon went a step further. It attributed to natural objects not only life and force but volition. And this, too, was the result of judging Nature by the standard of humanity. Man was conscious of will in himself; he knew that he could do things or refrain from doing them at will. He knew, too, that his fellow men could do him either good or, more

* *Anthropology*, ch. 14, p. 360.

† Deut. iv, 19; xvii, 3. II Kings xxiii, 11.

‡ *Anthropologie der Naturvölker*, vol. ii, p. 188.

§ *History of Greece*, preface, p. viii.

frequently, evil, and did it intentionally. But if the act of an enemy in bringing down a club upon his head demonstrated ill-will, what was to be said when a branch of a tree fell upon his head? He argued at once that the tree, *i.e.*, the spirit of the tree, was angry with him and meant to do him harm; and he sought either to punish the tree or to propitiate it, as his mood inclined him.

A child to-day, if it receives a painful injury, although through its own fault, from a lifeless object, will almost certainly, if left to itself, set about beating the object which has injured it. But the instinctive action of the modern child is the settled habit of primitive man. Thus a native of Brazil would try to bite the stone over which he stumbled or the arrow by which he was wounded. It is even told how a modern king of Cochin China would put one of his ships, if it sailed badly, in the pillory like a human criminal.

Times have changed, civilisation has advanced, but the same disposition reappeared in the Athenian judicial procedure when a court of justice sat in the Prytaneum upon an axe or a stone which had caused the death of a human being; and again down to quite recent days, in the provision of the English law by which not only an animal which killed anybody, but a cart which ran over a person, or a tree which fell upon his head, became *ipso facto* devoted or elevated to the service of God's poor.

Primitive man then personifies Nature. He spiritualizes Nature. He invests natural objects not with life only but with will; and his religion, as expressing the relation which he conceives to exist between his own spirit and the spiritual force outside himself, naturally takes the form of an attempt to influence the unseen powers in which he instinctively believes.

This is the beginning of religion. It contains the germs of all the infinitely various creeds and cults which have elevated or desolated humanity.

For as man's intellectual faculties were strengthened by observation and reflection, it was almost inevitable that he should effect the speculative transition from so-called idolatry to polytheism, from the worship of many gods to the worship of

fewer gods, and in the end to monotheism. The spiritual powers resident in all natural objects converge into the one great spiritual power who is called God. And the gradual ennoblement of religion lies in the purging away of all the material imaginations which have gathered around the pure spirituality of God Himself. For when once the existence of spiritual beings, many or few, was apprehended, the belief in the one Supreme spiritual Being was a sure result of time and thought.

In this paper I have treated the origin of religion from the human side alone. I have inquired how man, being such as he is and living in such a world as he inhabits, developed his religious instincts and capacities. But there is a divine side as well to religion. For man is religious, because God has created in him a natural aptitude for religion. He owes his religious interpretation of the natural world to the constitution of his own nature. Also, however much he may reflect upon external nature, however eagerly he may seek to discover in it the counterpart of his own natural character, yet the sublime truths of the Christian religion are such as he cannot learn for himself, but must get to know, if at all, by direct spontaneous revelation of God. For revelation is in fact nothing else than the divine communication of vastly important spiritual truths which man is, and must ever be, impotent to discover apart from the inspiration of God.

RESOLUTION.

Moved by Professor J. W. SPENCER, D.Sc., and seconded by Colonel T. H. HENDLEY, C.I.E., and carried, "That the thanks of the Meeting are hereby accorded to the Right Rev. Bishop Welldon, D.D., for his able and interesting address."

The following Resolutions were also put to the Meeting by the PRESIDENT and carried :—

frequently, evil, and did it intend an enemy in bringing down a club of ill-will, what was to be said when upon his head? He argued at the spirit of the tree, was angry with harm; and he sought either to protect it, as his mood inclined him.

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MINIARY GENERAL MEETING.*

AL SIR H. L. GEARY, K.C.B., V.P., IN THE CHAIR.

of the General Meeting held on June 13th were read and

The following candidates were elected :—

Professor J. Dyneley Prince, Columbia University, New
ev. Chas. T. Townley, M.A., Christ Church Rectory,
Leonard Sutton, Esq., F.L.S., Hillside, Reading; J. M.
Esq., M.D., Michigan.

—Rev. H. C. Thomson, D.D., Albuquerque; Miss Caroline
Beyrout; Heywood Smith, Esq., M.D., London; John H.
Esq., London; R. Tilden Smith, Esq., Clapham; A. C.
Esq., Highgate; Mrs. Theodore Bent, London; George A.
Esq., London; C. Wallington, Esq., London; Rev. Forster
n, M.A., Bury St. Edmunds; Henry B. Bilbrough, Esq.,
n; Rev. A. R. Cavalier, London; Colonel W. Sidebottom,
nester; Rochester Theological Seminary, New York.

Following paper was then read by the author :—

“RESEARCHES IN SINAI”

By Professor W. M. FLINDERS PETRIE, D.C.L.

(Review by the Secretary.)

Professor Petrie's numerous works the last is certainly not the least important. The “Researches in Sinai” is the outcome of a vast amount of laborious observation, resulting in throwing fresh light on the cult and character of the very Egyptian monarchs and their subjects, especially in connection with the search for minerals in a region not forming a part of Egypt proper, but adjoining it, and incidentally throwing light on parts of O.T. history. Having myself travelled through the Sinaitic region in 1883–4 when accompanying the expedition sent out by the Palestine Exploration Committee, it affords me special interest to read the narrative recorded, and to examine the numerous photo-illustrations with which this fine work is embellished. Almost every page contains a surprise; and the remarkable knowledge of the ancient hieroglyphics which the author has acquired in his researches in Egypt and the Nile valley are here happily applied in deciphering tablets dating back over 5,000 years B.C. and more ancient even than those of Tel el Amarna and of Abydos. Professor Petrie is to

* Monday, December 10th, 1906.

be congratulated on the success of his labours, supplemented by those of his wife and trained Staff.

It was a happy thought when the author determined to transfer his work to the wilderness of Sinai from "the green plains of Egypt." The hope of doing so existed from the time of his first visit to Egypt twenty-six years previously, and while engaged in his excavations in the Nile valley, he often cast a wistful eye towards that mysterious mountain region lying to the east of the Nile and the Gulf of Suez described in more or less detail by previous explorers, of which the late Sir C. W. Wilson, Professor Palmer, Captain Raymond Neill, and others, including the writer of this paper, had published reports of discoveries. As the land of the Exodus, the region received an additional interest; and it is gratifying to know that the author is able to throw fresh light on the Biblical narrative of that wonderful migration of the early Israelite host, and to clear up some doubtful questions connected with the numbering of the Tribes, which have hitherto given rise to adverse, though not unfair, criticism. To this subject the author devotes an entire chapter (xiv), in which he shows that the large number of the Israelites at the time of the Exodus, as given in the Authorised Version, results from a probably incorrect translation of the Hebrew word *Alf*, which has two meanings, either a "thousand" or "a group or family"; so if we adopt the latter meaning, that of a "family" or tent, each tent holding on an average 9·3 persons, the total number is reduced to about 5,550 persons, a number which is quite consistent with the events both before and after the crossing of the Red Sea.*

While on this subject it is gratifying to know that Professor Petrie holds the view that at the time of the Exodus the Red Sea extended northwards from Suez so as to include the Bitter Lakes, a view which I have advocated ever since my visit to this country.† There has, therefore, been a slight elevation of the land since this historic period, owing to which the sea has receded to its present limit at Suez. The "passage," therefore, was made to the north of this place, in a position now cut

* This explanation has been contested by an able writer in the *Saturday Review*, July 21st, 1906. The statements of that writer are incorrect. The exact meaning of *alf* in modern Arabic, where we can enquire the meaning, is *a group of persons, united, but not numerous*, which agrees well to a tent group of family and servants. The same root is in Hebrew and Assyrian.

† This view is advanced by Sir W. Dawson (*Modern Science in Bible Lands*) and by the writer. See "The Passage of the Red Sea," by Major-Gen. Tullock, *Trans. Vict. Inst.*, vol. xxviii, p. 277, etc.

through by the great canal between Migdol and the sea over against Baal-Zephon (Exod. xiv, 2).

There were three localities at which special investigations were carried out by Petrie, namely, the Wady Nasb, Maghareh and Serabit el Khadem. The search for ancient Egyptian monuments in the vicinity of Jebel Musâ (the traditional Mount Sinai) was entrusted to Mr. C. T. Currelly, without any important results beyond those previously recorded by earlier observers. This mountain, which takes such a prominent position in the history of the Exodus, had apparently been left unnoticed, and perhaps unvisited, by the Egyptian monarchs during their occupation of the country. As far as we know, it contains neither gold, copper, nor turquoise. The Wady Nasb was a place of great importance owing to the occurrence of copper ore, which has been worked by Egyptian miners from very ancient times. It was visited by Mr. H. Bauerman some years ago, who made a discovery very interesting to geologists. This discovery consists of a terrace of Carboniferous Limestone rich in marine fossils (*Q.J.G.S.*, xxv, p. 17). Some years afterwards (1883) it was visited by the party sent out by the Palestine Exploration Fund, and we brought away a considerable number of fossils, of which a list is given in the Geological Memoir.* Up to this time no Carboniferous strata had been recognised, and their discovery enabled the writer to determine the existence of two great sandstone formations, namely, that newer than the limestone, which is of Lower Cretaceous age and known as the "Nubian Sandstone," and that on which the limestone rests, and which is therefore in all probability of early Carboniferous age, and named by the writer "the Desert Sandstone."† To this older formation the great red sandstone beds of Serabit and Magharah are probably referable. The masses of slag from the copper mines at Wady Nasb show the extent of the ancient works; and, through the aid of Mr. Lintorn Simmons, Professor Petrie was able to find a rock inscription dating from the 20th year of the reign of Amenemhat III. (3300 B.C.); under whose authority the mines were doubtless worked. The copper vein probably owes its origin to a large fault bringing up the ancient schistose and granitic rocks; and to the same agency the important spring of water around which the camels encamp and get their supplies is probably also to be attributed.‡

As Professor Petrie was not in search of minerals but of

* *Phys. Geol. Arabia Petrea*, etc., pub. by P.F.S., pp. 48, 49.

† *Ibid.*, p. 44 et seq.

‡ *Mount Seir*, ch. iv, p. 41.

inscriptions, there was not much to detain his party at Wady Nasb, and he was satisfied with a stay of one day. Proceeding to the Wady Maghareh, important discoveries were awaiting them in the form of tablets dating from Semerkhet of the 1st Dynasty, 5291 years B.C., and onwards; being the memorial works executed during the expeditions of successive kings when opening mines in search of the precious turquoise. This mineral occurs in the Carboniferous Sandstone, consisting of a solid mass of horizontal strata three miles wide, set in between the granite of Wady Sidreh on the south and that of Tartir el Dhami on the north. The rocks of this district are very ancient, probably of Archæan age. From the photographic pictures it is seen to be a ridge of rugged heights culminating in a peak 3,531 feet above the sea. Farther to the south, at a distance of 25 miles, rises the serrated ridge of Gebel Serbal, perhaps the most striking of all the Sinaitic mountains, reaching to 6,734 feet above the Gulf of Suez, visible from on board the ships when sailing down the Gulf of Suez, and is often mistaken for Mount Sinai (G. Musâ). Further towards the S.E. is Mount Sinai itself, amidst a group of heights, some exceeding it in elevation, such as G. Katharina-Zebir (8,551 feet).*

The turquoise occurs in thin veins, generally under a stratum of "iron-stone," situated near the top of the formation, and this is also the level of the tablets, seven in number, connected with the mines; except that of Semerkhet, which is 400 feet above the valley floor, while the others are at a level of 170 feet.† The ages of the tablets range downwards to that of Tahutmes III. of the XVIIIth Dynasty (1481-1449 B.C.). The author gives us elaborate accounts of the excavations, and of the huts for the miners placed at the edge of a cliff 200 feet high and protected by blocks of stone against the wind, or possibly against the intrusion of wild beasts, such as hyenas and jackals, which still inhabit this region. Of the tablets, the most striking are those of Semerkhet (Plates 45, 46, and 47). In this last the King is represented as smiting with his mace an unhappy Bedaway chief, who crouches at his feet and tries to defend himself with his right arm—in vain! The King carries a dagger in his girdle, and is preceded by two figures, one of whom is the general of the expedition. The tablet is cut out of a face of sandstone, the figures shown in relief; and considering the great age of this

* "Researches," Fig. 36.

† Iron-stone varies from ferruginous sandstone up to pure fibrous hæmatite in various localities.

work of art (over 7,000 years), it is in a state of marvellous preservation and seems to have been scarcely injured by weather action. Happily the face of the rock is here inaccessible, and records the conquest of Sinai by a King of the Ist Dynasty of the Egyptian monarchy. The tablet just described is the only one remaining at Maghareh, the others having been removed to Cairo—some in a broken and defaced condition due to a lamentable episode which the author records with just indignation. It appears that previously to the visit of Professor Petrie's party, a company had been formed to develop the turquoise mines and had received a concession from the Government at Cairo. No care seems to have been taken by the department which gave the concession to prevent injury to the monuments, and (to use the words of the author) "ignorant engineers destroyed what was, in the European market of museums, worth far more than all the turquoises which they extracted." He then goes on to detail the damage which was done by these modern Vandals to monuments remaining after thousands of years of freedom from injury: "The Khufu sculptures were smashed up; the Assa inscriptions were destroyed or buried; the Pepy inscriptions were annihilated, as were also those of Amenemhat; the Sneferu scene was brutally defaced with a hammer, and the only portrait of Sneferu has been destroyed. The Sahura scene and the Men-ken-hor tablet have both been partly blasted away, and pieces have been knocked off the tablet of Ra-n-user." Thus have European workmen of the 19th century, A.D., under the protection of the Egyptian Government, wantonly destroyed works of art which have descended to us intact through thousands of years;—the loss of which is irreparable!

The next important locality, and the richest in historic records, visited during this memorable expedition is the valley of Serabit el Khadem, situated some miles to the north of Maghareh and visited by the members of the Expedition of 1883. As in the case of the latter, the mines of turquoise were worked in the same sandstone formation, and to a very thorough extent by means of galleries opening out at the face of the cliffs and carried far into the solid mass beyond. Excellent pictures of these galleries are given in Figs. 72 and 73.

Before commencing operations at Serabit, Professor Petrie made a trigonometrical survey of the valleys with their included terraces by means of the sextant and prismatic compass and plotted the work on the spot. The area surveyed is about one and a half miles from east to west, and three miles from north

to south, and is bounded by the Wady Serabit on the east and that of Bateh on the west. This locality is remarkable, not only for the turquoise mines, but also for numerous stelæ and memorial stones or "Bethels"* which it contains, and especially for the temple containing the shrines of the goddess Hat-hor, "Mistress of Turquoise," of whom we have a bust representation in Figs. 130 and 132. A much later head, represented in Fig. 140, is said by the author truly to be one of the most baffling of faces!

Amongst the monumental treasures of Serabit is the statuette of Queen Thyi, the consort of the magnificent monarch Amen-hotep III. of the XVIIIth Dynasty (1414-1383 B.C.)†. Petrie pays a high tribute to the noble character of the features and the beauty of execution of the statuette itself, and says that it is one of the most striking portraits ever carved by an Egyptian (p. 126) She is shown wearing a crown of gold, carrying in its centre her cartouche, by which she has been unmistakably identified.

The restoration in plan of the temple of Serabit el Khadem is one of the most remarkable achievements of this expedition. We have this restoration presented to us in three distinct pictures (Figs. models 93, 94 and Map 4), the last being an architectural plan on a scale of 20 feet to the inch. Here we have the earliest shrine, consisting of the sacred cave of Hat-Hor in the highest point of the platform, of an age apparently as early as Sneferu, 4750 B.C. From this the temple grew outwards until it reached a total length of 230 feet, and ultimately consisted of a sanctuary, two chambers ("greater and smaller Hanafiyeh"), the court, pylon, shrine of the Kings and cubicles for sleepers. The walls are frequently covered by inscriptions, and the whole surrounded by enclosures of broken rock and rubble. The shrine of the Kings lay outside the walls of the temple on the north side, and on this side was a line of stelæ, or sacred upright stones, so-called "Bethels," to which we shall refer again. At the entrance there formerly stood two tall stelæ, the northern one of Ramessu II. (1300-1234 B.C.), the southern one of Set-Nekht (1203 B.C.); the former was complete, though cracked from top to base, when the Expedition of the Palestine Exploration Fund took their photographs.‡

* Referring to the pillar set up by Jacob, Gen. xxviii, 19.

† Fig. 133.

‡ This was the first expedition under the late Sir Charles W. Wilson. Those acquainted with the temples of the Valley of the Nile will recognise the resemblance of the plan of the Temple of Luxor to that of Serabit el Khadem. See Dr. Budge's handbook of *The Nile*, p. 284, in which the plan of the Luxor Temple is given.

We have referred to the light which some of the discoveries are calculated to throw upon Old Testament history, and Professor Petrie draws attention to the familiar account of Jacob's dream and the stone which he set up for a pillar as a memorial of God's presence. In Gen. xxviii, 10-19, we read, "And Jacob rose up early in the morning and took the stone that he had put for his pillow, and set it up for a pillar, and poured oil upon the top of it, and he called the name of that place Bethel" (The House of God). The district of Serabit el Khadem is replete with such Bethels—single pillars, some surrounded with a circle of stones, others standing by themselves. In some cases they are sculptured with hieroglyphics, in others they are plain. In these memorial stones Petrie recognises representatives of Jacob's monument, as it is clear from their surroundings that they had a religious object and bearing—and he refers to illustrations drawn from other countries, chiefly Oriental, with a Semitic system of religion. Numerous plates illustrate the frequency of these Bethels in the Sinaitic region.*

The author thus sums up the character of the worship at Serabit el Khadem, p. 192: "We have before us a Semitic cave-shrine older than the Mosaic system. We see in it a great goddess, probably Ishtar, worshipped alone, and later on associated with a god. Her ritual was that of burnt sacrifices and incense offerings; many ablutions were required of the worshipper; sacred conical stones were dedicated in her temple, and oracular dreams were sought, and memorial stones (Bethels) were erected where the devotees slept. The essential features of Semitic worship are here shown in earlier use than in any other instance, and we see how much of Mosaism was a carrying on of older ritual; how that movement was a Monotheistic reformation of existing rites, and how the paganism of the Jews was but the popular retention of more than was granted in the state religion."

It was no part of Professor Petrie's object in visiting the Sinaitic peninsula to "follow the track of the Israelites," but it is personally gratifying to myself that he appears in general agreement with the views of Wilson, Palmer, and the members of the Palestine Exploration Fund Expedition (1883-4) as stated in the narrative of that Expedition.† I am unable, however, to

* On the name Bethel see Mr. Tuckwell's remarks in the discussion: it seems an error to call the stone a "Bethel."

† *Mount Seir, Sinai and Western Palestine*, ch. vi. p. 51. The opinion of Professor Palmer, supported by Sir Charles Wilson, ought to be quite conclusive on the subject.

agree with Mr. Currelly in his view that Gebel Serbâl is the mount from which the Law was delivered (Ch. xvii, p. 247). I am in accord with him, and the distinguished travellers above named, in supposing that after the Israelites left their camp by the Red Sea, on the plain of El Markha, they took the route through the Wady Feirân, even to this day well watered and green with palms and herbage: but I fail to see why, if this were the case, Jebel Serbâl was the mount of the Law, or Horeb. The Wady Feirân, although it passes along the northern spurs of Serbâl, was not, as Mr. Currelly supposes, the camping ground of the host, but only their line of march towards the Mount of the Law, or J. Musâ. When our party visited it in 1883, we encamped in the valley at its base and ascended to its summit, and it appeared to present all the conditions required by the narrative, of which, as Mr. Currelly remarks, water supply is the most important. This is here practically abundant. There is not only the fine cascade descending from the little natural basin of water below the summit, but four or five perennial streams fed by the melting snow of winter.* Perhaps the most striking point of identification is the Ras Sufsafeh, the lofty vertical cliff at the head of the valley of encampment called the W. el Deir, and answering to the "Mount that might be touched," as it forms the base of Sinai, and shuts off the view of the summit from occupants in the plain; conditions which literally agree with the narrative in Exodus.† As I have more fully dealt with this subject in *Mount Seir*, and also in my paper read before this Institute, I will not further discuss this position, but will only add that nothing has been written which I have seen, including the essay by Professor Sayce, "Where is Mount Sinai?" which induces me to change the opinion formed on the spot, that Jebel Musâ, the traditional site of the Mount of the Law, is the true site.‡

* *Phys. Geol. of Arabia Petraea*, pp. 25, 26; *Mount Seir*, pp. 58, 59.

† Sayce tried to prove that the Mount of the Law was situated somewhere amongst the Edomite mountains, east of the Arabah. This view is still more improbable than that of Currelly.

‡ The impression produced on the writer's mind by the scene may here be quoted: "We marched up the wide plain of W. es Sheikh, and afterwards turning to the right, entered the W. el Deir, when we came in front of the grand cliffs of Ras Sufsafeh, rising abruptly from the plain and intersected by several deep clefts . . . I felt satisfied that here was the camping ground of Israel, and in front 'the Mount of the Law.'" *Mount Seir*, p. 51.

I have replied to Professor Sayce in a paper read before this Institute, so need add nothing further on the subject.*

Mr. Currelly has decided in favour of Gebel Serbâl being the Mount of the Law as against the traditional Gebel Musâ. Before doing so he might have consulted previous authorities of greater weight and knowledge of the Sinaitic region than himself, such as Professor Palmer, Sir Charles Wilson and the Rev. F. W. Holland. To these I may be allowed to add the conclusion arrived at by the members of the Expedition of 1883-4.

What foundation, therefore, is there for the statement of Currelly that "the view that Gebel Musâ is Sinai is supported by tradition alone"?† He himself recognises in the same page that Professor Palmer held the view which coincides with that of tradition, but explains that he was "carried away by the idea that the great plain of Raha was the only place in the peninsula where such a vast assembly could have witnessed the giving of the Law." This is a very poor objection: Palmer had better reasons than this for his decision. The Bible narrative does not support the statement that the people "witnessed the giving of the Law"; on the contrary, the summit of Sinai, where the law was delivered to Moses, is expressly stated to have been invisible from the camping ground of the Israelites, and the prophet was lost to sight. The statement is, "As for this Moses . . . we wot not what has become of him." Ex. xxxii, 1.

How little weight ought to be attached to Mr. Currelly's conclusions may be gathered from an event which occurred while crossing the watershed into the Wady Berrah. It appears that some flakes of snow fell, and, lighting on the black cloaks of his attendant Egyptian fellahin (who had never seen snow flakes before), they ran up to him enquiring what the flakes were, in a state of much excitement. Currelly adds quite seriously, "May not this be the manna which fell from Heaven when the children of Israel moved along these valleys"?‡ and he deliberately discusses the question, arriving at the conclusion "that snow answers all the attributes of [manna] described except that it is not food," truly a splendid inference, arrived at by much careful comparison with the description of manna in Exodus! Mr. Currelly might have been supposed to be joking, but this was not so; it is clear from the statement that he is perfectly serious.

* See *Trans. Vict. Inst.*, vol. xxxi.

† p. 251.

‡ p. 230.

It is strange that Professor Petrie should have allowed such a wild idea to be printed in his book, and it is only inserted here to show the extent of his companion's reasoning powers.

This work will prove of the greatest interest to Oriental scholars and Egyptologists as tending to throw additional light on the events of Egyptian history, and the succession of the "Dynasties"—although drawn from a region outside and beyond the Valley of the Nile; and the learned author is to be congratulated on the success of his explorations and the able manner in which he has placed the results within reach of the public.

DISCUSSION.

The CHAIRMAN.—Ladies and Gentlemen, I think I shall be expressing your wishes in thanking Professor Hull for the interesting paper read to us this evening. We have had the advantage of the comments of one who has travelled over the ground in question and formed an opinion on the spot—the opinion of a skilled observer.

In an audience like this, I cannot conceive a more interesting subject for consideration and discussion than that which has to do, not only with the journeyings of the Israelites after the Exodus, but the remains of a religious cult going back, as I understand it, authentically to between 5000 and 6000 B.C. These seem to me to be the two directions into which the paper divides itself. I have not read Professor Flinders Petrie's book, so I do not feel justified in taking up more of your time. I would only express the hope that some interesting comparison may now be possible between the memorial stones or "Bethels," which Petrie describes with those which are to be found in other countries, more especially in Northern Africa, the West of Europe and our own Islands.

Rev. JOHN TUCKWELL, M.R.A.S.—I desire to express my appreciation of the value of the paper which has been presented to us by our Secretary. We cannot all hope to possess the expensive volume on which the lecture has been based. I feel, however, that I must take exception to the use of the term "Bethel" which has been made by Professor Petrie. The Scripture narrative tells us plainly that

it was the "place," and not the stone which Jacob called a "Bethel." It was in that place that Jacob became vividly conscious of the presence of God, and the stone was erected as a memorial of his experiences there. This misuse of the term "Bethel" is the more to be regretted because it is used by infidelity as the origin, in the supposed evolution of Christian doctrine and practice, of the more modern temples and other places of sacred service. I should like to add also that the number he assigns to the Biblical narrative of the Israelites based on the use of the term "alf" is equally at variance with the history of the journeyings of the Israelites through the desert. The number of the men according to Professor Petrie's calculation would be quite incommensurate with the number requisite to carry on the wars which are described in the Biblical narrative. It appears, therefore, that we must rather accept Professor Petrie's theories and reject the plain narrative of Scripture or we must accept the Scripture narrative and reject Professor Petrie's theories. I confess that I prefer the latter.

Deputy Surgeon-General PARTRIDGE.—May I say a word about what is said by Professor Petrie regarding the number of the Israelites who left Egypt being only 5,550 persons. The Bible tells us (Exodus xxx, 11-16), that when the people were numbered every man (above 20) gave a ransom for his soul *a half-shekel of silver*, the rich not more, the poor not less. We know what was done with this silver; it was made into silver sockets for the boards of the Tabernacle, and the four pillars of the vail (Exodus xxxviii, 27), and for the silver hooks, fillets and chapiters of the Court (Exodus xxxviii, 28). *Each socket* weighed a talent (Exodus xxviii, 27) = 3,000 shekels or 6,000 half-shekels. There were two sockets to each board, and there were 48 boards, so there were 96 sockets, also there were four sockets for the four pillars of the vail. Total, 100 sockets, each socket = 6,000 half-shekels. Total, 600,000 *half-shekels*!

For the silver hooks, fillets, and chapiters of the Court, 3,550 *half-shekels* were used (Exodus xxxviii, 28).

So then the amount of silver used was
$$\left. \begin{array}{r} 600,000 \\ 3,550 \end{array} \right\} \text{half-shekels}$$

603,550

Now Exodus xxxviii, 26, tells us that the number of men numbered (above 20 years old) was 603,550, which is the exact number of half-

shekels used for the court and boards, so the Bible estimate is proved to be absolutely correct, and Professor Petrie's estimate of 5,550 absolutely wrong.

The Levites were numbered separately, and they numbered 22,000 over one month old (Numbers iii, 39).

It is interesting to notice, that at the end of the 40 years' wanderings the new generation which entered Canaan, numbered 601,730 (over 20) Numbers xxvi, 51, and the Levites numbered 23,000 (over one month) Numbers xxvi, 62, or 1,000 more altogether than came out of Egypt.

Mr. JOSEPH OFFORD.—Professor Hull in his interesting review of Professor Flinders Petrie's work upon the Sinaitic remains of Egyptian occupation there, has not treated of some important evidence they afford as to certain peoples mentioned in the Old Testament. In reading the Egyptian Sinaitic inscriptions it is curious to notice that two of them relate to XIIth Dynasty expeditions, an echo of which is preserved in the memorial of a certain Khonsovkou found by Mr. Garstang, in Egypt, in 1900.

The new texts which throw light upon the Old Testament, however, are still more interesting because they show that the Egyptians were well acquainted with three tribes which appear in the geographical and ethnographical list contained in Genesis xxxvi. Those are the Lotan or Lotanu, the Horites, and the Aiah. Moreover the inscriptions, or a certain papyrus, connect them racially and territorially as does the Old Testament. The first of these valuable inscriptions records a campaign against the Sakimim country and the tribe or people of the Lotanu, who were encountered during an expedition to the land of Monition-Sati which in early Egyptian times denoted near Asia, or rather South Syria.

Immediately the text was translated it confirmed a previous supposition of Professor Max Müller that the people read "as named Tanou" upon the celebrated papyrus relating the travels and adventures of Saneha, should be read Lotanu.

Saneha tells us they occupied two districts which he terms Lotanu simple, and Higher, or Upper Lotanu. The Sinaitic inscription of Senofrit mentions a chief, or Sheikh, named Khebta, or Khebtata, who he says was brother to the Lotanu king. This Sinaitic prince was evidently an ally, if not a sub-official, of Egypt,

his name appearing in several lists of their officers and superintendents.

It will be seen that these monumental records and the Saneha papyrus all assign the Lotanu to the Sinaitic district in "Middle Empire" times. Later, however, under Thothmes III., for instance, they were stated to be farther away to the north, a matter which need not be explained here. But in Saneha's time some of the Lotanu had evidently gone further away from Egypt, and thus had become to his mind the Upper Lotanu.

As mentioned these early monuments also speak of the Horu or Horites as contiguous to the Lotan. This second tribe the Egyptians also subsequently located elsewhere, for the Golenischef papyrus of a voyage to Phœnicia calls the Mediterranean near Byblos "the sea of Hor." However, in Egyptian records, up to the XIXth Dynasty, Horu signified a district close to the Egyptian frontier, and Seti I. says that leaving Zaru, a place near Ismaeliyeh, and marching to Kanana (Canaan), he traversed Horite territory. Therefore at his epoch the north-west angle of the Sinaitic district commencing at Zaru "the gate of Egypt" was Horite land, and perhaps stretched as far, at the date of Thothmes III., as Gaza. So about 2000 B.C. Horu and Lotan were between South Palestine and Sinai, projecting somewhat into each, and not many days' journey from the Egyptian delta.

This quite coincides with Genesis xxxvi, 36, where Lotan is identified as "first" born of Seir, a people lying between South Palestine and the Akaka Gulf. Hori, son of this Lotan, like all nomadic pastoral people, pushed out from the Lotan area to further fields and pastures, settling, according to Egyptian evidence, in the districts of the Sinaitic region towards Gaza.

It is evident that the Egyptians in their Sinaitic inscriptions faithfully transcribed the local tribal names, subsequently using these ethnic titles as geographical ones. This is further confirmed by the Saneha papyrus mentioning the Aiah of the Bible, the nephew of Lotan, Genesis xxxvi, 24; and also either Qedem, or Adema-Edom; the correct reading of these two names is not quite certain. Saneha speaks of Aiah as being an oasis famous for its vineyards. It is certainly remarkable that two names of Asiatic neighbours to Egypt should be found in Genesis, and that a little later under the XIIth Dynasty there should be associated a papyrus

with a third Biblical name: all these three being, in the Old Testament records, placed in the region between Palestine and Egypt, and that the proof of this should be elicited as soon as ever Egyptian texts situated in the proper region beyond their frontier where they might be anticipated, are scientifically examined. Of course there are scores of other Biblical places and peoples also mentioned in Egyptian records.*

Professor LANGHORNE ORCHARD.—While very sensible of the great value of Professor Flinders Petrie's work, I must associate myself generally with the criticisms to which we have listened. We cannot go back in human history to 5000 B.C. Dr. Petrie's chronology, apparently following that of Mahler, is not his strong point. Borchardt has shown its unreliability.†

The number of the Israelities at the time of the Exodus, as computed by Professor Petrie, is surely too small. If we are to translate *alf* in this connection by "group," the group must have been a very large one; for when in Egypt the Israelites had increased exceedingly and filled the land, so that Pharaoh was afraid of them. When we consider that the population of America increased in rather more than 120 years from the Declaration of Independence to 60 times its original number,‡ we need feel no surprise that in 210 years the number of Israelites had multiplied into something very great.

In investigating the site of Mount Sinai, account should be taken of the fact that "the people encamped before the Mount" (Numbers xix). This at once negatives the idea that Sinai is Jebel Serbal. Serbal, though a magnificent mountain, has no plain before it suitable for such a camping ground. A fair review of available evidence points to the conclusion that Sinai is at the rear of Ras Sufsafeh. Ras Sufsafeh, with its two valleys—the immense Wady

* For the Asiatic people known to the ancient Egyptians, see four articles by M. Ballerini in the Italian *Journal Bessarione*, 1901, "*Le Tribù Nomadi della Palestina o del Sinai, Seconda Memorie dell'Egitto Antico*," and an essay by M. Isidore Lévy upon the "Horites of Seir and Egyptian records" in the *Revue des Études Juives*, January 1906.

† *Proceedings of the Society of Biblical Archaeology*, vol. xx p. 264.

‡ But was not this largely due to immigration as well as natural increase from births?—ED.

Er Rahah to the north-west, and the Wady Esh Sheikh to the north-east—satisfies *all* the conditions. It has been remarked by Urquhart that the Israelites would, in this case, be enclosed in an almost impregnable mountainous fortress, assailable from only two directions and easily defended.

We shall concur with Professor Hull that "Professor Petrie is to be congratulated on the success of his explorations and the able manner in which he has placed the results within reach of the public." We shall cordially thank Professor Hull for the concise, clear and interesting manner in which he has brought the more important of those results before us this afternoon.

Mr. ROUSE.—There can be no doubt that in the interpretation just dealt with Professor Petrie desired to bring the Bible statement within the bounds of common experience. But the expedients will not assort with other facts in the sacred story. Nor is there the cause that he imagines for lengthening the Berlin chronology. In order to make room, as he says, for the XIIIth and XVIIth Dynasties* as well as for the Hyksos, he finds it needful to add a whole Sothic period to the apparent difference in date between an astronomical observation made late in the XIIth Dynasty and another made early in the XVIIIth. But that this is needless is evidenced by the list of kings whose monuments he has found in and around the mines of Sinai; for whereas the XIIth Dynasty has a continuous record of its seven kings on these monuments, and from the second king of the XVIIIth, who acceded in 1562 B.C., down to the fourth king of the XXth, who acceded in 1156, there is only one break and that of only 55 years (which we know to have been troubled ones), on the other hand no king of either the XIIIth or the XVIIth Dynasty is represented at all. The inference is natural that the kings of the intermediate native dynasties were contemporary with and subordinate to the Hyksos kings; that, when the Hyksos invaded Egypt, the miners who, as appears from the Sinaitic records, were Semites, fled back to their distant homes; and that the Hyksos, having during their conquest of Egypt let the mines slip, were never powerful enough to renew Egyptian ownership over them. It is indeed strange that Professor Petrie should reckon the XIIIth and

* Manetho assigns three dynasties to shepherd kings; but he calls them the 15th, 16th, and 17th.

XVIIth Dynasties as preceding and following the Hyksos, when the tablet of Abydos, which gives a list of the predecessors of Rameses, passes straight from the XIIth to the XVIIIth Dynasty, omitting all mention of ancestors in between. Moreover we know that in the latter part of the domination of the Hyksos in the north of Egypt there were kings in the south, three of whom bore the name of Ra-Sekenen, for we have a list of these in a record of the rifling of tombs, besides a fragmentary correspondence between one of these and Apepa, the Hyksos king; while the naval captain Aahmes, son of Abana, who, among other feats, tells us that he shows great courage in the siege of Avaris, the Hyksos capital, under King Aahmes I., founder of the XVIIIth Dynasty, records also that his father had been "a captain of the deceased King Ra-Sekenen" (Brugsch, *Hist. Egypt*, English Translation, vol. i, pp. 282, 283). And we may add that Manetho, in his story of the Hyksos, preserved by Josephus (and abundantly confirmed by Professor Petrie in his discovery of Avaris last year), says that "the kings of Thebes and other parts of Egypt finally raised a revolt against the Hyksos, which led to their departure from Egyptian soil."

The Egyptians fixed their New Year's Day originally by an astronomical event which falls at the time of year when the inundation of the Nile begins to be felt in their country, namely, the rising of the dog-star (Sothis) with the sun, or as closely before the sun as it can be seen, which takes place on July 21st,* as Censorinus tells us.† But because the Egyptian kalendar year was always exactly 365 days (no leap years being used), the New Year's Day (the 1st of Thoth) went back nearly a quarter of a day in each successive year until it had made the whole circle of 365 days; and the time taken to effect this was known as the Sothic period. This is usually accepted as 1,460 years, and Petrie so accepts it, while hinting that this falls somewhat short of the mark, but it really was 1,506 years. The precise length of the solar year in 1900 A.D. was 365·5·48·45·975; and, since it has shortened itself in every century by only ·5305, it is easy to calculate that in Petrie's second Sothic period (1322 B.C. to 139 A.D.) its average length was 365·5·48·56, and in the next period before that only 8 seconds longer. The 8 seconds make no

* Of the Julian Kalendar or 22nd of the Gregorian.

† Petrie, pp. 164 and 165.

difference, and the time required in each case to turn this fraction of a day into 365 days is certainly 1,506 years.

Thus the 25 days' recession* that Censorinus remarked had taken not 100, but 103 years to bring about :

and the date of his account being 239 A.D.,
the last previous Sothic period had ended in 136 „
and the next previous one 1,506 years earlier = 1369 B.C.

Now, since in the ninth year of Amenhotep I., the 1st of Thoth fell 57 days after the heliacal rising of Sothis

and $\frac{57}{365} \times 1,506 \text{ years} = 235 \text{ years},$

his ninth year is brought to 235 years before 1369 B.C. = 1604 B.C.

and his first year to 1612 „

and since Aahmes I., his immediate predecessor and founder of the XVIIIth Dynasty, reigned 25 years, he acceded in 1636 B.C.†

Again, in the seventh year of Sennsert III. the 1st of Thoth fell 139 days after the heliacal rising of Sothis,

and $\frac{139}{365} \times 1,506 = 574 \text{ years},$

which brings his seventh year to 574 years before

1369 B.C. = 1943 B.C.

and his last, or 38th year, to 1912 „

Amenemhat III.'s last, or 44th, year, to 1869 „

Amenemhat IV.'s last, or 9th year, to 1861 „

Sebeknefern's last, or 4th year, closing the XIIth Dynasty,
to 1858 „

Seeing, then, that the XIIth Dynasty ended in 1858 „

and the XVIIIth began in 1636 „

there remained for the Hyksos kings in the north and for their contemporaries, the under-kings of the XIIIth and XVIIth Dynasties in the south, 222 years instead of the 30 years that Petrie leaves to the Hyksos as sole monarchs.

[In one important matter, Petrie, both by discovery and inference, utterly confutes the rationalists. In the mines and the many-

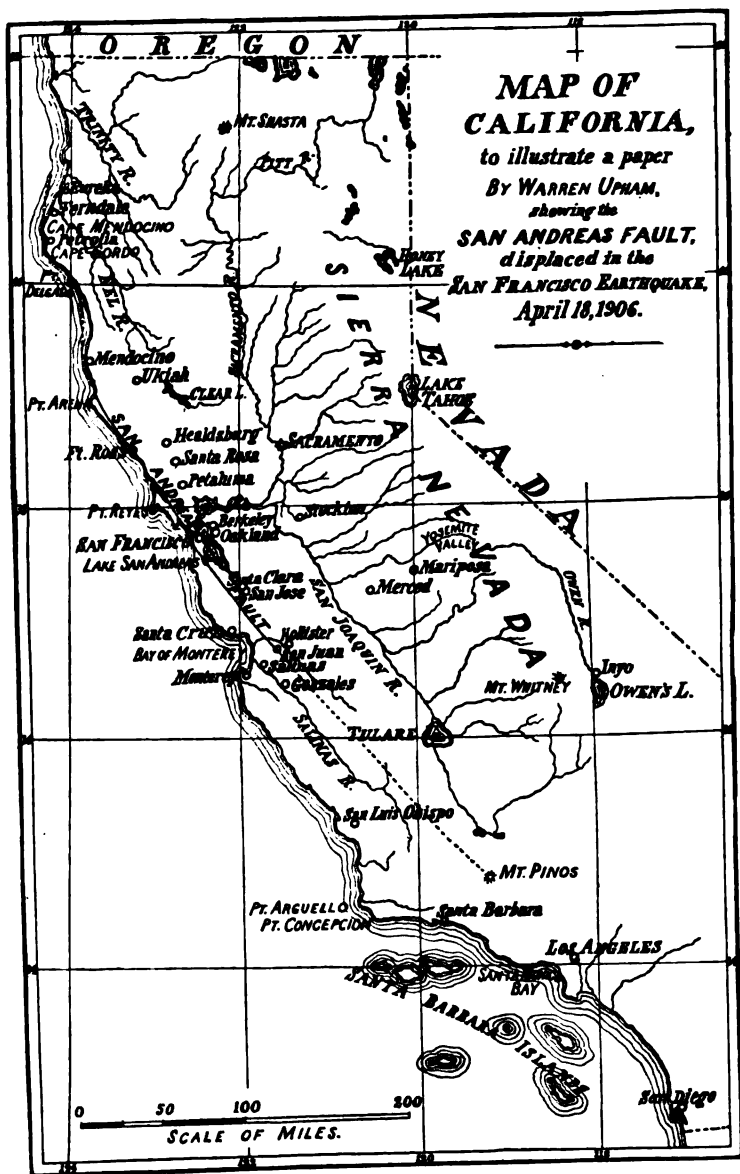
* It appears to be 26 days ; but June 25th Julian=June 26th, Gregorian, which is one day nearer to July 21st.

† In nearly every case the "last year" of one king is the "first year" of his successor.

chambered temple of Maghareh and Serabit he has found many examples of a non-Egyptian writing akin to the Phœnician, or early Hebrews, in the mines upon squares marked out side by side on the walls, also in the temple upon rough images—too rough to be of Egyptian design, and he concludes beyond doubt that this was the writing of Semitic labourers. And further, he asks, in view of this evidence and that of the Tell-Amarna letters, "Can it be supposed that the" Israelite "officers, who were responsible for the amount of work" (done at Ramses and Pithom—Exod. v, 10, 11) "were left without any of the training in writing and registering which was essential to every Egyptian?"]

Professor HULL, in replying, expressed his pleasure at the interesting discussion which his paper had called forth, and asked to be allowed to convey to Professor Petrie the thanks of the meeting for the loan of the lantern slides which had helped so much to elucidate the subject of the paper.

The CHAIRMAN put the question, which was carried unanimously. The meeting then terminated.



ORDINARY GENERAL MEETING.*

DAVID HOWARD, ESQ., D.L., V.P., IN THE CHAIR.

The Minutes of the previous meeting were read and confirmed and the following candidates were elected :—

ASSOCIATES.—Lieut.-Col. W. W. Baker, R.E., Bombay. Malcolm W. Searle, Esq., K.C., LL.D.

The following paper was then read by Col. Hendley, in the absence of the author :—

THE SAN FRANCISCO AND VALPARAISO EARTH-QUAKES AND THEIR CAUSES. By WARREN UPHAM, M.A., D.Sc., F.G.S.A. (Hon. Corresponding Member). (With map.)

FOUR months after the terrible earthquake and resulting conflagration which destroyed more than half of San Francisco, the largest city on the Pacific coast of North America, a similar appalling disaster, with much greater loss of life but less of property, has stricken Valparaiso, the largest South American Pacific seaport.

THE SAN FRANCISCO EARTHQUAKE.

Briefly noted, the Californian earthquake, most disastrous in San Francisco, but also dealing much destruction throughout a large area both north and south of that city, occurring in the early morning of Wednesday, April 18th, 1906, at 12 minutes and 6 seconds past 5 o'clock, killed probably in all the stricken region nearly 1,000 people ; and the shock and ensuing fires inflicted a total property loss, according to the lowest careful estimates, of about \$300,000,000.

The sudden horror of the first and most violent earthquake shocks, as told by witnesses, and the harrowing experiences of

* Monday, January 7th, 1907.

many during the next three days in escaping from the wide devastation of fire, are so fresh in the memories of those who were there, and of all who have read the accounts given in newspapers, magazines, and books already published, narrating and portraying the awful events and scenes, that they need not be again recited. In this paper attention will be directed mainly to geological description and explanation, so far as can be determined, of the causes of these two earthquakes, which came so near together, bringing ruin temporarily to the fairest and most prosperous cities on the Pacific coast of both the northern and southern American continents.

The first and greatest shock in San Francisco and the contiguous country had a duration of one minute and five seconds, as recorded at the observatory of the State University in Berkeley. It was followed within an hour by twelve minor shocks. During the same day the number of the secondary shocks was thirty-one ; and they continued for many days, generally diminishing in frequency and intensity, as is the usual history of great earthquakes. The ensuing minor shocks are due to secondary adjustments of the faulted rocks after the principal fractures and slips have relieved, almost instantaneously, the greater part of the stress which was pent up and growing through many years.

An area about 400 miles long from north to south and averaging fifty miles in width displayed in more or less degree the destructive effects of this earthquake. Its tremors were slightly felt much farther, from Coos bay in Oregon south to Los Angeles, and eastward across California into Nevada, being especially notable along the eastern flank of the Sierra Nevada.

To much greater distances, and indeed all the way around the world, the rock waves or vibrations ran rapidly and were recorded by the seismographs of observatories. Particularly important records of this paroxysm were thus obtained at Tokyo in Japan and at Potsdam in Germany.

Marvellous speed of transmission of the earth tremors or waves, similar to that ascertained in the case of the Charleston earthquake in 1886, was shown by the time of observations in Washington, D.C., and in Sitka, Alaska. Professor C. F. Marvin, of the United States Weather Bureau, writes of the transmission of the earth vibrations to the city of Washington :

"The great circle distance from San Francisco to Washington is about 2,435 miles, whereas the distance through the crust is about 40 miles shorter, and the straight-line path cuts below the surface

of the earth about 186 miles at its deepest point Because of its greater density and the enormous superincumbent pressure, the elastic properties of the deep-lying substance of the earth seem to propagate vibrations with higher and higher velocities the deeper the path. These considerations lead to the conclusion that if earthquake vibrations follow the path of the chord the speed of propagation should not be constant for all distances from the origin, but should be greater as the distance from the origin becomes greater. This has generally been found to be true in the case of the preliminary tremors, and will doubtless be shown in this earthquake when accurate reports from numerous stations are examined. From San Francisco to Washington the speed along the chord is found to be 5.4 miles (8.7 kilometres) per second. This is based on Professor Davidson's time at San Francisco, viz., 5.12 a.m. This result is perhaps a trifle faster than we might expect.

"The strong waves do not seem to follow the path of the chord, but rather travel along the surface at a slower rate, which is nearly constant for all distances. In the present case the velocity is 3.1 miles per second for the first strong waves, or as low as 2.2 miles per second for the maximum waves. Both of these speeds, however, are a little high, perhaps."

From records of an observatory of the United States Coast and Geodetic Survey at Sitka, 1,455 miles distant by the great circle from San Francisco, and about 1,447 miles by the chord, the velocity of the first tremors from this earthquake, supposed to have come along the chord, was 5.6 miles, or 9.0 kilometres, per second, the whole distance being traversed in four minutes and eighteen seconds.

ORIGIN OF THIS EARTHQUAKE FROM ROCK FAULTING.

Three days after the San Francisco shock, Governor Pardee of California appointed a commission of geologists to investigate its results and causes. Of this commission Professors Andrew C. Lawson and A. O. Leuschner, both of the State University, are respectively chairman and secretary; and the other members are Professors G. K. Gilbert of the United States Geological Survey, H. F. Reid of Johns Hopkins University, J. C. Branner of Stanford University, George Davidson of the State University, Charles Burkhalter of the Chabot Observatory, and William W. Campbell, director of the Lick Observatory. The commission have issued a preliminary report, noting chiefly the evidence of a prolonged new fracture and dislocation of the earth crust on an old fault plane, called the San Andreas fault, which cuts north-north-westward diagonally across the Coast

Ranges and passes into the sea at Mussel Rock, about seven miles south-west of San Francisco.

Other researches of the commission are in progress, to be published later, concerning the intensity of the shock at varying distances from the fault line, and the speed of passage of the shock and tremors around and also through the earth. When so thorough a study shall be completed as was given by Dutton and others to the Charleston earthquake, it may be hoped that important inferences will be obtained relative to the constitution of the earth's interior and its fluidity or solidity, a question of profound interest to geologists and physicists.

North of the Golden Gate, the San Andreas fault crosses outlying parts of the coast in several places; and south of Mussel Rock it passes by San Andreas and Crystal Springs lakes, and is traced to the vicinity of Mt. Pinos in Ventura county. Its known extent is about 375 miles. South-eastward from San Francisco, its course is remarkably straight, running obliquely across the mountainous belt that lies between the coast and the San Joaquin valley. This great fault plane, nearly vertically cutting the earth crust to great depths, is paralleled by several other ancient faults of similar character, a few miles apart, traversing the San Francisco peninsula, but movements of this earthquake appear to have affected only the San Andreas fault. (See map.)

The published report of the Earthquake Investigation Commission says:

"The cause of these movements in general terms is that stresses are generated in the earth's crust which accumulate till they exceed the strength of the rocks composing the crust and they find a relief in a sudden rupture. This establishes the plane of dislocation in the first instance, and in future movements the stresses have only to accumulate to the point of overcoming the friction on that plane and any cementation that may have been effected in the intervals between movements.

"The earthquake of the 18th April, 1906, was due to one of these movements. The extent of the rift upon which the movement of that date took place is at the time of writing not fully known. It is, however, known from direct field observations that it extends certainly from the mouth of Alder Creek near Point Arena to the vicinity of San Juan in San Benito County, a distance of about 185 miles. The destruction of Petrolia and Ferndale in Humboldt County indicates that the movement on the rift extended at least as far as Cape Mendocino, though whether the line of rift lies inland or off shore in that region is still a matter of inquiry. Adding the inferred extension of the movement to its observed extent gives us

a total length of about 300 miles. The general trend of this line is about N. 35° W., but in Sonoma and Mendocino counties it appears to have a slight concavity to the north-east, and if this curvature be maintained in its path beneath the waters of the Pacific it would pass very close to and possibly inside of Capes Gordo and Mendocino. Along the 185 miles of this rift where movement has actually been observed the displacement has been chiefly horizontal on a nearly vertical plane, and the country to the south-west of the rift has moved north-westerly relatively to the country on the north-east of the rift. By this it is not intended to imply that the north-east side was passive and the south-west side active in the movement. Most probably the two sides moved in opposite directions. The evidence of the rupture and of the differential movement along the line of rift is very clear and unequivocal. The surface soil presents a continuous furrow, generally several feet wide, with transverse cracks, which show very plainly the effort of torsion within the zone of the movement. All fences, roads, stream courses, pipe-lines, dams, conduits, and property lines which cross the rift are dislocated. The amount of dislocation varies. In several instances observed it does not exceed 6 feet. A more common measurement is 8 to 10 feet. In some cases as much as 15 or 16 feet of horizontal displacement has been observed, while in one case a roadway was found to have been differentially moved 20 feet. Probably the mean value for the amount of horizontal displacement along the rift line is about 10 feet, and the variations from this are due to local causes, such as drag of the mantle of soil upon the rocks or the excessive movement of soft, incoherent deposits. Besides this general horizontal displacement of about 10 feet there is observable in Sonoma and Mendocino Counties a differential vertical movement not exceeding 4 feet, so far as at present known, whereby the south-west side of the rift was raised relatively to the north-east side, so as to present a low scarp facing the north-east. This vertical movement diminishes to the south-east along the rift line, and in San Mateo county is scarcely if at all observable. Still farther south there are suggestions that this movement may have been in the reverse direction; but this needs further field study.

"As a consequence of the movement it is probable that the latitudes and longitudes of all points in the Coast Ranges have been permanently changed a few feet, and that the stations occupied by the Coast and Geodetic Survey in their triangulation work have been changed in position. It is hoped that a re-occupation of some of the stations by the Coast and Geodetic Survey may contribute data to the final estimate of the amount of movement.

"The great length of the rift upon which movement has occurred makes this earthquake unique. Such length implies great depth of rupture, and the study of the question of depth will, it is believed, contribute much to current geophysical conceptions.

* * * *

"Within the area of destructive effects approximately 400 miles in length by 50 miles in extent the intensity varied greatly. There was a maximum immediately on the rift line. Water pipes, conduits, and bridges crossing this line were rent asunder. Trees were uprooted and thrown to the ground in large numbers. Some trees were snapped off, leaving their stumps standing, and others were split from the roots up. Buildings and other structures were in general violently thrown and otherwise wrecked, though some escaped with but slight damage. Fissures opened in the earth and closed again, and in one place reported a cow was engulfed. A second line of maximum destruction lies along the floor of the valley system of which the Bay of San Francisco is the most notable feature, and particularly in the Santa Rosa and Santa Clara valleys. Santa Rosa, situated 20 miles from the rift, was the most severely shaken town in the State, and suffered the greatest disaster relatively to its population and extent. Healdsburg suffered to a nearly similar degree. San José, situated 13 miles, and Agnews, about 12 miles from the rift, are next in the order of severity. Stanford University, 7 miles from the rift, is probably to be placed in the same category. All these places are situated on the valley floor and are underlain to a considerable depth by loose or but slightly coherent geological formations, and their position strongly suggests that the earth waves as propagated by such formations are much more destructive than the waves which are propagated by the firmer and highly elastic rocks of the adjoining hill lands. This suggestion is supported by a consideration of the destructive effects exhibited by towns and single buildings along the same valley line which are situated wholly or partly on rock. Petaluma and San Rafael, though nearer the rift than Santa Rosa, suffered notably less, and they are for the most part on, or close to, the rocky surface. The portions of Berkeley and Oakland which are situated on the alluvial slope suffered more than the foothills, where the buildings are founded on rocks. The same suggestion is further supported from a consideration of the zone of maximum destructive effect on the south-west side of the rift. This zone lies in the Salinas Valley. The intensity of destructive action at Salinas was about the same as at San José, and the town is situated on the flood-plain deposits of the Salinas River. Along the banks of the Salinas River and extending from Salinas to the vicinity of Gonzales, so far as our reports at present show, the bottom lands were more severely ruptured, fissured, and otherwise deformed than in any other portion of the State . . .

"The Commission, in presenting this brief report, has had in mind the demand on the part of the people of the State and of the world at large for reliable information as to the essential facts of the earthquake. It has, therefore, not presumed to engage in any discussion of the more abstruse geological questions which the event

naturally raises. It leaves such discussion for a more exhaustive report, which can only be prepared after the campaign of data collection is complete, and that may be some months hence."*

PREVIOUS EARTHQUAKES OF CALIFORNIA.

During all the Pleistocene and recent periods of geologic history the area of California, and indeed of all our Pacific coast, has been frequently shaken by less or more severe earthquakes. Professor Edward S. Holden has catalogued them from 1769 to 1896, recording at least ten shocks of as great intensity as the last in the region of San Francisco.

The most severe shock in all this list was that of Owen's Valley or Inyo, about 275 miles east-south-east of San Francisco, on March 26th, 1872. Its fault line was near the steep east border of the Sierra Nevada, and the surface rocks and soil were broken along a distance of forty miles from north to south, with displacement of the side adjoining the mountain range, as compared with the other side, from 5 or 10 to 25 feet of vertical uplift.

In the thirty-seven years from 1850 to 1886 inclusive, Holden's catalogue shows 254 noticeable earthquakes in San Francisco, or an average of seven yearly. During the same time no less than 514 other earthquakes, not noticed in San Francisco, were felt in other parts of the State.

Summing up the characteristics of the California earthquakes, Dutton writes:

"High intensities are not common. The lighter intensities are felt over considerable areas, which suggest great depth of focus. The seismographic traces show considerable length of period and well-marked separation between the short preliminary tremors and longer waves, which is indicative of considerable distance travelled by the vibrations between the centrum and the recording station. The deep foci, the long periods, the absence of small tremors, the considerable areas over which light vibrations are felt, are indicative of tectonic rather than volcanic origin."

* A very interesting and detailed account of the Californian earthquake of 1906 is given by Professor T. W. E. David, of Sydney University, in the *Sydney Daily Telegraph* of December, who visited San Francisco shortly after the conflagration. His account closely agrees with that of the author.—EDITOR.

TWO PRINCIPAL SEISMIC BELTS OF THE WORLD.

About nine-tenths of all earthquakes occur along the two greatest and longest mountain belts of the world, one mainly encircling the Pacific Ocean, and the other stretching past the Mediterranean sea and far east through Asia.

From Cape Horn northwards through the western hemisphere towers the grand mountain belt of the Andes and the North American Cordilleras, the latter having their newest ranges on their west border, and both adjoining closely the Pacific coast. In Alaska this belt passes westerly, and its outermost southwestern range forms the Alaska peninsula and Aleutian Islands. Continuing westerly and in general taking nearly the course of a great circle, the same broad and far prolonged belt of mountain systems comprises Kamtchatka, the Kurile Islands, Japan, Formosa, the Philippines, Borneo, and Celebes, on the north-western and western side of the Pacific Ocean. In total, this Pacific coastal orographic belt extends over an arc of about 240 degrees, or some 16,000 miles.

The second great series of mountain chains is a very complex belt passing from east to north-west and west, comprising New Guinea, the Sunda Islands and the Malay peninsula, Anam and Siam, the colossal Himalayan ranges, the Caucasus, Carpathians, Balkans, Alps, Apennines, Pyrenees, and Atlas mountains, extending quite across the eastern hemisphere.

Along these two lines, transverse to each other, one having an extent of two-thirds and the other of half of the earth's circumference, the great lateral pressures of the earth's crust, primarily due probably to the cooling and contraction of its interior, have been relieved during the latest geologic ages by plication, faults, and uplifts, producing these most massive and prolonged series of mountains.

Many earthquakes occur in connection with the eruptions of volcanoes, which are found in many parts of these complex mountainous belts; but other earthquakes, much exceeding the former in respect to numbers, energy, and immense extent of the areas shaken, are independent of volcanic action, being instead due to fracture and faulting of the rock-formations far from any active or recently extinct volcanoes. Shocks of the latter class are called tectonic, meaning that they are associated with processes of mountain-building and upheaval of continents. To this class the shocks (or *temblors*, if we use the Spanish word) of San Francisco and Valparaiso belong, and also nearly

all the great destructive earthquakes of which we have historical records.

THE VALPARAISO EARTHQUAKE.

About eight o'clock on Thursday evening, August 16th, not quite four months after the Californian outburst, an equally or more terrible earthquake killed probably 2,000 people in Valparaiso and an adjoining large area of Chile, and wrought a destruction of property, with the great fires following, that is conservatively estimated at some \$200,000,000.

The first and most violent shock was followed by many less severe shocks during the subsequent days and weeks, showing conclusively that this was a great tectonic earthquake. The earth-waves or tremors and vibrations travelled with similar amazing speed as in the case of the Charleston and San Francisco shocks, and were recorded 5,000 miles away by the seismographs of the United States Weather Bureau in Washington, D.C., where the earth disturbance lasted several hours, ceasing about midnight.

Probably the Valparaiso shock originated in rock fracture and displacement on some principal fault plane cutting the land area in parallelism with the mountain ranges and the coast, but inside the shore line. That it was not, as with many earthquakes, beneath the sea, whether somewhat near to or remote from the shore, is indicated by the absence of any great sea wave, such as is raised by submarine shocks, sometimes rolling over the coast far above the highest tide level. This occasional accompaniment of violent earthquakes, most dreadful in its destruction of human lives, was absent from both these recent Californian and Chilian disasters.

PREVIOUS SEISMIC RECORDS OF CHILE.

The west coast of South America has abounded with earthquakes, mostly of slight effects but rarely very destructive, ever since the earliest coming and settlements of Europeans; and geologists recognise evidences of the same history through long preceding periods.

In the tabulation by De Montessus de Ballore, comprising very extensive records of earthquakes throughout the world, and giving a grand total of 131,292 observed shocks, mostly belonging to the last fifty years, Central Chile, from Illapel to Concepcion, including the region of Valparaiso and Santiago, had in forty-four years, from 1836 to 1841 and from 1849 to

1886, a recorded number of 1,512 shocks, or an average of about thirty-five yearly. "It is the Chilian coast and Andes," remarks Dutton, "in which the seismicity of South America reaches its highest development."

SECULAR MOVEMENTS OF THE EARTH'S CRUST.

Darwin, in his *Geological Observations on South America*, noted proofs, in raised shore lines with recent marine shells, that a vast area of this Pacific coast, extending from Southern Patagonia to Lima, a distance of about 2,500 miles, had been lately much uplifted, the vertical measure of the movement varying from 85 to 1,300 feet. The maximum uplift observed was in the vicinity of Valparaiso, where, however, in the 220 years preceding 1834 the vertical upward movement had not exceeded nineteen feet; but during the relatively short time of seventeen years, from 1817 to 1834, it had amounted to ten feet and seemed still in progress. Only a part of that average uprise of more than half a foot yearly could be attributed to a violent earthquake which occurred in 1822, and the remainder had taken place at a very slow and imperceptible rate.

It may be thought that the whole uplift of the Chile coast was accompanied by faulting and slight earthquakes, as more than thirty perceptible shocks have been observed on an average yearly in that district. But it seems more probable that in some other regions, and therefore even to some degree in Chile, extensive secular uplifts or depressions of large areas, continuing through several or many centuries, have taken place by gentle and moderate flexure of the rock crust, without faulting, or at least without any large displacement, and perhaps without energetic earthquakes.

Such a gradual crustal movement appears to have elevated the area of the Glacial Lake Agassiz, during the recession of the ice-sheet at the end of the Glacial period, where now is the basin of the Red River and Lake Winnipeg. This area, 500 miles long or more from south to north, and measuring 50 to 150 miles or more in width, was differentially uplifted to a maximum vertical amount of probably about 500 feet in the geologically short time, estimated about 1,000 years, while the glacial lake existed; and the uplift was nearly or quite finished before the latest remnant of the ice-sheet on Central Canada was melted away, thereby reducing Lake Agassiz to its present representatives, lakes Winnipeg and Manitoba. The continuousness and the gradual and unbroken northward

ascent of the old beach ridges of Lake Agassiz show decisively that no faults having much displacement occur in the large part of the glacial lake area surveyed by the present writer in Minnesota, North Dakota, and Manitoba, amounting to more than 30,000 square miles.

COURAGE FOR REBUILDING.

After powerful faulting and earthquakes have brought rest from the long accumulating stress of the earth crust, it may be expected that many years will elapse before so great pressure or strain will be again developed as to repeat and continue the rock displacement and oscillation. So it is with well-founded perseverance that the people of these stricken cities, possessing the best harbours of the west side of the two continents of this western hemisphere, have set themselves to rebuild their fallen homes, factories, and marts of commerce. The scene gives us an increased appreciation of the grand capabilities of man's mind and heart and hand. What does it tell of a higher, overruling and creating Power?

Quick, generous, and large aid from their fellow men far and near came to the maimed and hungry sufferers of earthquake and fire. We are inspired with better hope and confidence for the development of all the noble and kindly qualities which exalt mankind. Have the shaking and fiery trials also any teaching of the highest values of life and death in their relation to the Supreme Giver?

When a destroying plague or tornado or earthquake comes, we may be tempted for a time to distrust the grand truth of the goodness and universal fatherhood of God; but the correlative ennobling truth of the universal brotherhood of men then shines forth most clearly. The mighty affliction awakens in every heart sympathy, a brotherly spirit, and sweet charity, the greatest of virtues. Yet I will not doubt the divine goodness. Soon or late, in the ordinary course of nature, not less than in its wildest catastrophe, everyone is called to say, with old Job, in highest faith of God's ultimate kind providence and care, "Though He slay me, yet will I trust in Him." Is death more to be dreaded, and less to be welcomed, knowing that "He giveth His beloved sleep," if the summons be sudden, to a multitude together, after the momentary pang of a great convulsion of Nature, than if it be slow and gentle, with long warning and more suffering, to each one alone?

There are good reasons for the rebuilding of these cities, and

they are being rebuilt on better foundations and with greater foresight and effort for durability and safety than before. Then if the terrifying tremor comes again, the brave citizens will be conscious that they have done their best and are in the path and place of duty. The earthquake is more likely to try the quality of these people again than if they should remove to many other parts of the world; but no region on all its surface, though long remaining unshaken, can be assured of complete immunity from this danger.

The thanks of the meeting were then moved by the Chairman for this interesting communication, and he invited discussion thereon.

DISCUSSION.

Rev. A. IRVING, D.Sc., congratulated the Institute on the valuable paper by Dr. Warren Upham, and thanked the author for putting forward so clearly the causal relation of earthquakes of the San Francisco and Valparaiso type to those tectonic forces which are operative as mountain-building agents, which of necessity continue more active in such comparatively young mountain ranges as those which mark the features of the Pacific seaboard of the dual American continent. The speaker confessed, however, to some feeling of regret that more recognition had not been given to previous literature bearing upon the subject. He referred more especially to the writings of his friend, Dr. Andrew C. Lawson, the Chairman of the Commission appointed by the Californian State authorities, after the San Francisco earthquakes in April last, to investigate the causes of that disaster. He held in his hand, and read quotations from, a most able paper by Professor Lawson, on "the Geomorphogeny of the Coast of North California," in which it was clearly shown, some twelve years ago, that the basin of the harbour of San Francisco was formed by a subsidence—a "sag-down," as engineers would say—of the crust in Quaternary and recent geological time, letting in the waters of the Pacific to fill the shallow basin (nowhere more than 250 feet in depth), submerging the lower portion of the valley of the Sacramento, and converting

the former river gorge into the present magnificent "Golden Gate." So clearly had the geotectonic structure of the region been worked out by Lawson, that the speaker had ventured in a public address (within a fortnight of the occurrence of the earthquake) to offer with some confidence what seemed to him—as a deduction from Dr. Lawson's paper—to be the true explanation of the earthquake, in the sudden relief of strain in the bed-rocks of the region, along a plane or planes of slip-faulting, which are generally found in the synclinal portions of all great flexures of the earth's crust.

In the interim "Report" of the Commission, which reached him three or four weeks later from Dr. Lawson, he had the satisfaction to find that the explanation he had suggested agreed with that put forward by the Commission as given in Dr. Upham's paper.

The speaker regretted that Dr. Upham had not been able to give more detailed information, at present, as to the nature of the crustal movements, which had operated with such disastrous results in the Valparaiso region; but he strongly suspected that further investigations might result in interpreting those upward movements mentioned by the author, as indicating "over-thrust" fault-planes due to the fact that the region in question is situated on the ridge of an anti-clinal fold. If that should turn out to be the case, the fact would probably account for the wider extension of the disastrous results there than in the San Francisco region.

Dr. Irving ventured to put before the Meeting an interesting problem, which had presented itself to his mind, as to a possible connection in time between the occurrence of the San Francisco earthquake and the great eruption of Vesuvius about a week before, with the abnormally extensive extrusion of lava from the depths at which molten or potentially-liquid rock-material exists.* The latitude of Vesuvius and of San Francisco being nearly the same, and approximately 40° N., a simple calculation gives us a rapidity of rotational movement from west to east along that zone of latitude of something like 700 miles per hour (about ten times greater than the velocity of the fastest express train) to represent the 1,000 miles per hour velocity of rotation of the outer rind of the earth in equatorial regions. The extrusion of lava at Vesuvius

* On this point reference may be made to the speaker's letters to *Nature* in May, 1905, vol. lxxii, pp. 8 and 79.

and the escape of vast quantities of super-heated water would tend to create a vacuum below the mountain ; but that result would be prevented by the inflow of the surrounding molten or potentially-liquid material. Taking into account the vast eastward momentum (here pointed out) of the whole mass, dynamical considerations led us to believe that the inflow would be chiefly from the west of the Neapolitan area ; and therefore the power of buoying up the crust would be diminished along a zone of latitude extending a good way in that direction round the globe. Such a disturbance of equilibrium would make itself especially manifest where the conditions of the crust caused local weakness and a tendency to subsidence, such as Dr. Lawson had shown to exist in the San Francisco region. He put this forward as a thesis for discussion, and would be glad if any better mathematician than himself could find a flaw in the argument.

[It might be noted that the great San Andreas line of fault shown on the map accompanying the paper, running nearly parallel to the Coast Range, was also shown on a very valuable map, which had been constructed by Professor Branner, of Sandford University, and was published in the Supplement to *The Times* on December 17th, 1906, showing how seismic intensity was centered in and around the San Francisco region as the result of the local instability of the crust.]

Professor H. LANGHORNE ORCHARD, M.A., B.Sc.—Although tectonic earthquakes may be said to be independent of volcanic action, yet there is a connection between earthquakes and volcanoes. Volcanoes form outlets for the accumulated and pent-up energy, thus moderating the violence of the outbreak. The volcano is like the safety-valve of a steam-engine. This explains the fact (referred to by the author) that earthquakes accompanied by volcanic action are less destructive than others.

With regard to the two great seismic belts (traced out in the paper), it is a relief to note that England is not in either of these belts, though apparently perilously near to the second. Probably we owe more than is generally supposed to the friendly vicinity of Iceland.

The great depth of rupture, in the case of the San Francisco earthquake, is remarkable, and the Investigation Commission are to be thanked for directing attention to the importance, in relation to geophysical science, of studying the question of depth.

I should like to ask Professor Hull what, in his view, is the general explanation of the circumstance that earthquake waves which are propagated through loose geological formations are more disastrous than those propagated through firm ones as stated by the author.

We shall concur with the learned author that these destructive visitations afford no argument against the goodness of God and His over-ruling power; and that it is death itself, not its method or mode, that claims our serious concern. Undoubtedly, the only sure basis for a rational fortitude in presence of death is that unlimited trust in God which was possessed by Job.

Professor LOGAN LOBLEY, F.G.S.—Besides being an interesting account, Dr. Warren Upham's paper contains some points of considerable scientific and seismic value. With its main contention that the two earthquakes were of tectonic and not of volcanic origin I am in entire agreement.

Such earthquakes are the result of forces originating pressures, strains and tensions which, when resistance is overcome produce, a sudden movement of the surface rocks. The whole of the Pacific coast of America is being elevated, and it is this that causes its frequent and sometimes disastrous earthquakes, as well as the volcanic activity which is also a conspicuous characteristic of this region. Thus both the earthquakes and the volcanic eruptions have the same ultimate cause and so are, in a sense, related.

I cannot, however, agree with the author that these forces are produced by the shrinkage of the globe from cooling, for I have shown, I think, conclusively, that there has been no appreciable diminution of the mean radius of the globe since Cambrian times. These great forces producing elevations and subsidences, rock foldings and earthquakes, and giving the conditions allowing volcanic action are, I believe, due to regional expansions and contractions.

Neither can I favour the suggestion that there was a connection between either of these seismic movements and an eruption of Vesuvius ejecting an insignificant amount of material 6,000 miles distant.

We certainly owe our thanks to Dr. Warren Upham for presenting us with his concise account of two memorable catastrophes.

Col. T. H. HENDLEY, C.I.E.—Previous speakers, as well as the writer of the paper, have referred to the rapidity of the transmission of the earth tremors. Under certain circumstances the

motion may be seen, as for example, when, one night in the hot season, I was reading in bed in a large room in India, of which the floor was a smooth surface of white marble cement. A smart earthquake shock occurred, and my bed was actually raised, but the solid floor, nearly six feet thick, heaved up like the sea when a wave passes over it, without being broken.

Dr. Upham observes that the intensity varied greatly over the large disturbed area. Even in small districts such variation is noticed.

In Mymensingh, in Eastern Bengal, I saw the ruins of the English church, which was represented by a pile of stones. Houses close by were also destroyed, yet within a few yards of them stood others which were intact.

The curious effects of earthquakes were peculiarly illustrated in Bengal, where I would mention the case of a temple spire near the Dacca Racecourse. The upper part of the heavy solid shaft had been separated by a horizontal fracture from the lower portion, and had been turned round, without leaving the perpendicular, so as to rest at an angle upon its base. Many other peculiar effects are often noticed, such as distortions of rails, extraordinary alterations in positions of the parts of walls, and so on.

As to the moral and mental effects glanced at by Dr. Upham, the Nawab of Murshidabad, being an invalid, was carried out of his palace by his servants when the great Bengal earthquake took place, and although he himself escaped, the severe injury and death to one of his men so affected him that at the time of my visit he would never remain long under a masonry roof, but received his friends in a small thatched building. Similar instances are very common.

As regards the great destruction attending sea waves which are raised by submarine shocks, we might instance the enormous loss of life some years ago, amounting to perhaps a quarter of a million persons, in the Bakarganj disaster in the Sundarbans in the Ganges Delta. Even an ordinary rise of a foot or two at flood times in the monsoon season is dangerous. Once when I was going in a steamer towards Barisal the capital of that district, I saw cattle on a village site standing with their heads just out of the water, and villagers on the house roofs, all waiting patiently for the flood to subside. It is easy under such conditions to realise

what a sudden upheaval and a great sea wave may do. When the great disaster of which I have spoken happened, many feeble persons escaped only because they were not strong enough to get away in boats or retreat to higher ground and were left in the tree tops.

There are many other incidental questions which are suggested in the interesting paper to which we have listened, but I would only ask one question, and that is, whether any observations had been made as to the effect of the San Francisco earthquake on the barometer? When the Krakatoa catastrophe occurred the meteorograph at Jeypore, which was under my care, indicated that a wave passed round the world two or three times.

Professor HULL, F.R.S. (Secretary)—I wish, in seconding the resolution, to be allowed to make a few remarks on the geological aspects of this valuable communication.

First—I may observe that this earthquake shock of 1906—though lamentably disastrous to life and property—if it had taken place two centuries ago, would have been passed over as a matter of indifference to the outer world.* If there were any inhabitants at all, they would have consisted of a few Indians, to whom the shock would have brought no great terror or loss. The disasters which followed the earthshock of last year were due to the existence of a great city with all the appliances of modern civilisation.

Second—The vertical displacement of the ground and rocks on either side of the St. Andreas fault, or fissure, was trifling when compared with that which has taken place in very recent geological times in other parts of the world. For instance, the great fault crossing the Grindelwald in Switzerland, which I have myself seen, along which the granitoid rocks are upheaved several thousands of feet, is as recent as the Middle Tertiary or Pliocene period. That of the Arabah Valley in Arabia Petræa, which has been traced for about 400 miles from the Gulf of Akabah into Syria, has an uplift of about 4,000 feet where it passes along the eastern margin of the Dead Sea and is of the same age; and, to come nearer home, the fault which bounds the great plain of Cheshire on the east side at the foot of Mowcop, in North Staffordshire, has a displacement of about 3,000 feet. But what is remarkable is, that the two former

* San Francisco was not occupied by Europeans till the year 1776.

dislocations are geologically of very recent date ; and any displacements of the strata since the Pliocene period are comparatively insignificant, and would be little thought of were it not for the spread of civilised inhabitants and their works.

Third—The third point I would like to refer to is the wonderful accuracy, due to astronomical methods, by which the rate of transmission through the earth's crust of the shock (or "wave") has now been attained. Dr. Warren Upham's remarks on this point are of great interest, where he shows the rate as transmitted through an arc of a Great Circle,* as compared with that of its chord. In proportion to the distance from the focus of disturbance, the relative lengths increase till the diameter of the earth is reached.

The respective rates are shown on the board, as given by Professor C. F. Marvin, and seem to bear out his conclusion that the density of the interior mass increases with the depth from the surface. This is one of the physical problems on which opinions differ, as the effect of the increase of temperature due to depth is to diminish density. Which of these agents *ultimately* prevails is at present unknown. These observations have a strong bearing on the question of the state of the earth's matter below the "crust." The great uplifts of the Middle Tertiary period appear to have given place to gentle and moderate flexures of the rock "crust" in more recent times, as stated by the author. I regret very much I cannot give a satisfactory reply to Prof. Orchard's question, except that loose material gives way more readily than solid when shaken,

* i.e., a circle, or arc of one, of which the centre passes through the centre of the earth.

ORDINARY GENERAL MEETING.*

CAPTAIN HEATH, R.N., IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed.

The following candidates were put forward for election by the Council and elected :—

ASSOCIATES.—H. Neville Harris, Esq., India Civil Service (Retired);
Rev. Prof. F. J. Jewett, B.D., Texas, U.S.A.

The following paper was read by the Author :—

THE SCRIPTURAL IDEA OF MIRACLES.

By Rev. Canon R. B. GIRDLESTONE, M.A.

- § 1. Nature and God according to the Bible.
- § 2. God's hand in Evolution and in Growth.
- § 3. Doctrines common to the Bible and natural science.
- § 4. Phenomena which the Bible records, but which natural science cannot formulate.
- § 5. Biblical miracles.
- § 6. Miraculous phenomena connected with the mission of Christ.
- § 7. The Philosophy of miracles.
- § 8. The question of evidence.
- § 9. Gospel miracles carry their own evidence with them.
- § 10. Conclusion.

§ 1. NATURE AND GOD ACCORDING TO THE BIBLE.

THE Bible and natural science regard nature from different but not necessarily from antagonistic points of view. It is frequently supposed that if you believe in the Bible you cannot believe in Science, and that if you believe in Science you cannot believe in the Bible; but the two beliefs are not necessarily irreconcilable. The Bible sets forth the spiritual

* 21st January, 1907.

side of nature and links all things with God. It frequently passes over intermediate processes, just as we do in common conversation, as when we say (for instance) "it rains." The man of science on the contrary is busy with processes. The first chapter of the Bible describes the origin of the existing order of things. It gives us a bird's-eye view of nature. It is a *multum in parvo*, not an encyclopædia. It tells us of results rather than of processes. Its main object is to produce a certain impression on the mind with regard to the living God. Certainly it leaves plenty of room for the investigations of the man of science. He may be an astronomer, a geologist, a meteorologist, a chemist, a botanist, a comparative anatomist; but to one and all the first page of the Bible says, "Come hither and behold the wonderful works of God."

The Bible student is liable to mistakes. He sometimes reads into the Hebrew Scriptures what is not in them, and sometimes through mistaken reverence tries to close the door against the enquirer who wishes to know both the "how" and the "why" of everything. The student of nature is also liable to mistakes. He is not content with aiming at a catalogue of the myriad of things which make up nature, nor would he be satisfied even if he could formulate the rules and methods whereby the whole system of nature is carried on. He wants to get further back, to detect nature in its most primitive workings before it got to be what it now is, before the stratification of the earth's crust had begun, before matter had solidified, before the fiery *nebulae* had clustered round their centres, before the atoms had ranged themselves into the elements, before electricity had spoken its first word. These investigations are now in full swing. They are grand in conception: but they are attended by a certain risk which may be hinted at by a word which I use in no offensive sense—nature-worship.

Let us suppose that in course of time Science should succeed in formulating natural monism, *i.e.*, should trace all the forms of matter to electricity, and all the processes of electricity to one. This would be the master key to nature. It would have the promise and potency of all known phenomena wrapped up within itself, and would be the universal parent of all things visible and invisible, including of course the Mind which has discovered this wonderful thing, and the human Spirit in all its phases and possibilities. But should we even then do without God? There is something in our nature which inevitably demands a hearing, and which appeals not to electricity but to

a personal spiritual author not only of electricity but of the human spirit, in other words, to God. All Christians are monists, but we get our monism out of the first verse of the Bible.

Where then does nature end and God begin? We are perpetually adjusting and readjusting our answer, delimiting the border of the known and the unknown, of the physical and the spiritual, exploring, in imagination, the regions beyond, sometimes almost succeeding in unifying mind with matter, and yet after all having to confess our failure. This is because we are what we are, in the world but not of the world, in the flesh but not of the flesh. The mysterious *ego* stands aloof from the phenomena of the physical universe and witnesses for God. If He is inscrutable, so are we.

§ 2. GOD'S HAND IN EVOLUTION AND IN GROWTH.

The missing link between the beginning of all things and the present state of the world is supposed to lie in the hand of the Evolutionist. At times the word Evolution becomes almost oppressive. It is regarded as the prime minister of creation. Perhaps it is so; who can say for certain? but, after all it is only a minister. It is not automatic; nor is it a substitute for creation—only a suggested method. Moreover, it has to do with the past—mainly if not entirely. It is intended to account for the multiplicity of “kinds” from matter up to man. But now we depend not on fresh processes of Evolution but on post-Evolutionary Growth. I am inclined to think that the power and wisdom of God may be seen more clearly in the phenomena of growth than in the theory of Evolution. Take, for example, the growth of a chicken within its prisonhouse the egg-shell. Here we have a fact staring us daily in the face. How many millions of years are needed for the development of that chicken from a protoplasmic speck? It would seem as if a million years of evolution became one day in growth. Bear in mind that in saying this I am not mocking at the labours of the evolutionist, but appealing for a full recognition of the daily miracles of nature in the animal and vegetable world. Every “kind” is a terminus to the preceding process which we now call Evolution; then Growth comes on the scene and shows us the handiwork of the living Architect of the Universe as He now operates in nature.

§ 3. DOCTRINES COMMON TO THE BIBLE AND NATURAL SCIENCE.

There are certain things which the Bible and natural science teach in common, and we do well to recognise them. I will

leave the student to determine for himself which was first in the field.

(1) *Both proclaim the unity of Nature.*

Whether the book of Genesis is an historical work dating from the patriarchal period, as I believe, or whether it is a patch-work put together from old traditions and myths in later ages, it did this great thing—it testified that all nature was one inasmuch as it was ultimately traceable to one Author. "The earth is the Lord's and the fulness thereof." Science has laboriously reached the same result though by a different road. It has learnt the correlation of physical forces not only upon earth but in the heavens. It is sufficient for me to refer to the late Duke of Argyll's book on this great subject.

(2) *Both agree in the fixity, stability and continuity of Nature.*

The Psalms express this truth in sublime language, recognising as they do that this fixity is the result of a Divine decree. "He hath established them for ever and ever; He hath made a decree which shall not pass." Isaiah speaks to the same effect, though he points to a period when the existing order of things shall pass away.

On the scientific side I need only remind you of the late Professor Balfour Stewart's instructive book on *The Conservation of Energy*, and of that other notable book, I hope not yet forgotten, *The Unseen Universe*.

(3) *Both agree in the doctrine of causation, i.e., that natural phenomena are under control and are the result of ordered forces.*

No effect is produced without a cause; the same causes produce the same effects; if they do not follow, it is because we have neglected some factor in the causes. I do not say—science does not say—that no physical effect is produced without a physical cause. It is here that one has to weigh one's words most carefully. Man's will is, properly speaking, not a physical cause, but it produces wonderful physical effects. A word is a cause of action, and a thought is the cause of the word being spoken, and the *ego* is the thinker, though he utilises his brains in thinking. The Bible says of God, "He spake and it was done," and constantly reminds us that He is the author of the forces (in other words, of the causes) operating in nature.

Nothing is left to chance in the material world; fixed causes produce fixed results which cannot be evaded. There is thus a sort of necessity imposed on our material surroundings, yet we ourselves rise above it, not that we are absolutely free, but that our human will has to be reckoned with as among the causes of things. Modern psychology does not ignore these facts of consciousness.

Dean Mansel in his powerful essay on miracles in *Aids to Faith* (p. 19), says, "Deny the existence of a free will in man; and neither the possibility of miracles, nor any other question of religion or morality is worth contending about. Admit the existence of free will in man; and we have the experience of a power, analogous, however inferior, to that which is supposed to operate in the production of a miracle, and forming the basis of a legitimate argument from the less to the greater. In the will of man we have the solitary instance of an efficient cause in the highest sense of the term, acting among and along with the physical causes of the material world, and producing results which would not have been brought about by any invariable sequence of physical causes left to their own action. We have evidence also of an elasticity, so to speak, in the constitution of nature, which permits the influence of human power on the phenomena of the world to be exercised or suspended at will, without affecting the stability of the whole."

(4) *They agree in the position assigned to man.*

The Bible gives man dominion over earth and its inhabitants. He is at liberty to turn them all to his own account. Science says that man has the biggest brains of any animal in proportion to his size; hence his extraordinary powers and his adaptability to almost every possible environment. He has the gift of insight into the processes of nature; he weighs the planets, tells us what metals are to be found in the stars, fastens the electric force to his carriage, spoils the animal, vegetable, and mineral worlds of their possessions, reproduces the past, anticipates the future, and lifts his mind up to communion with the unseen God.

§ 4. PHENOMENA WHICH SCRIPTURE RECORDS BUT WHICH
NATURAL SCIENCE CANNOT FORMULATE.

I have by no means exhausted the points of union between the Bible and science, but I go on to observe that there are

some subjects frequently referred to in the Bible which natural science is not in a position to fathom. It must observe, compare, test and check results before it can draw conclusions and formulate results; and this does not seem possible in the following cases:—

- (1) *The ways of Providence.*—By this I mean not so much the provision made for man, in his adaptation to earth, and *vice versa*, but rather the fact that all nature and all human action are subservient to divine purpose.
- (2) *Prayer.*—By this pouring out of the soul God is acknowledged and worshipped, and His divine intervention is sought in the interests of individuals and communities, according to Scripture. Prayer is certainly recognised as a force; but it has its limitations and conditions.
- (3) *Inspiration.*—Special communications and influences from above may be brought under this head; inspiration properly includes all direct action of the spirit of God on the spirit of man.
- (4) *Prophecy.*—The utterance of divine truth and the laying down of the programme of divine purpose as affecting the future of individuals, of communities, and of the world at large.
- (5) *Angelic visitations.*—These imply the existence of superhuman beings in a sphere more ethereal or less material than our own.
- (6) *Miracles*; i.e., physical phenomena which are unaccountable by the known laws and processes of nature. To these I must now confine myself, and I give this as only a provisional definition of them.

§ 5. BIBLICAL MIRACLES.

No distinction is insisted on in the Bible between what is natural and what is supernatural. The course of nature is God's ordinary way of action, and the laws of nature are His ordinary rules, but He is not absolutely restricted to them. There may be agencies stored up both in the natural and in the spiritual world of which we have no conception at present. The bounds of the possible, in nature as well as out of it, have not yet been reached.

Nor is any rigid line to be drawn between what is Providential, that is to say, a special application of the ordinary known forces of nature, and what is miraculous, i.e., something

which cannot be so described. Students will classify these differently.

The flood, the destruction of Sodom and Gomorrah; the leprosy of Miriam and of Gehazi; the swallowing up of Korah; the death of Ahab in consequence of the bow drawn at a venture; the block in the Jordan which enabled Israel to go over dryshod; these may have called for no special agency, but they were *timed* to happen at a particular moment in connection with certain other events. But in the case of Aaron's rod which budded, or Balaam's ass that spoke, or the Pillar of Fire, or the signs granted to Hezekiah and to Jonah, we see events which cannot be altogether accounted for by known forces. Occasionally the means whereby an effect was produced are recorded, as in the case of the wind bringing the locusts, or drying up the Red Sea. Sometimes the thing which is done is wrought through delegated human agency, or through inspired human words of prayer, as in the case of the prolonged day in Joshua's time,* and the descent of the fire in answer to Elijah, and the coming and going of the plagues of Egypt in connection with the intercession of Moses.

We have lost the original idea and intention of miracles. They are never regarded in the Bible as Hume regarded them as violations of the laws of nature. The three Hebrew words used of them in the Old Testament and the three Greek words in the New Testament show that they are manifestations of *power* ("mighty works"), that they call forth *wonder* (which is the true idea of the word "miracle"), and that they are *signs* attesting the mission of the person who does them. The first definite miracles wrought by the hand of man are probably those wrought by Moses; and they were his credentials. It is only fair to the Biblical miracles that they should be studied in their completeness, as a long series culminating in the mission of the Lord Jesus Christ. They are associated with spiritual teaching, and they are recorded by men who give full proof of their honesty and candour. Moreover, there is nothing grotesque about them, nor are they like fables or fairy tales. This is peculiarly the case with the wonderful works of Christ, and with the other special events associated with His mission.

* This does not necessarily seem to belong to the list of miracles. It is partly a quotation from a poetic account in "the book of Jasher," as is clear from the passage, Josh. x, 13. See also Habakkuk iii, 11.—Ed.

motion may be seen, as for example, when, one night in the hot season, I was reading in bed in a large room in India, of which the floor was a smooth surface of white marble cement. A smart earthquake shock occurred, and my bed was actually raised, but the solid floor, nearly six feet thick, heaved up like the sea when a wave passes over it, without being broken.

Dr. Upham observes that the intensity varied greatly over the large disturbed area. Even in small districts such variation is noticed.

In Mymensingh, in Eastern Bengal, I saw the ruins of the English church, which was represented by a pile of stones. Houses close by were also destroyed, yet within a few yards of them stood others which were intact.

The curious effects of earthquakes were peculiarly illustrated in Bengal, where I would mention the case of a temple spire near the Dacca Racecourse. The upper part of the heavy solid shaft had been separated by a horizontal fracture from the lower portion, and had been turned round, without leaving the perpendicular, so as to rest at an angle upon its base. Many other peculiar effects are often noticed, such as distortions of rails, extraordinary alterations in positions of the parts of walls, and so on.

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Professor HULL, F.R.S. (Secretary)—I wish, in seconding the resolution, to be allowed to make a few remarks on the geological aspects of this valuable communication.

First—I may observe that this earthquake shock of 1906—though lamentably disastrous to life and property—if it had taken place two centuries ago, would have been passed over as a matter of indifference to the outer world.* If there were any inhabitants at all, they would have consisted of a few Indians, to whom the shock would have brought no great terror or loss. The disasters which followed the earthshock of last year were due to the existence of a great city with all the appliances of modern civilisation.

Second—The vertical displacement of the ground and rocks on either side of the St. Andreas fault, or fissure, was trifling when compared with that which has taken place in very recent geological times in other parts of the world. For instance, the great fault crossing the Grindelwald in Switzerland, which I have myself seen, along which the granitoid rocks are upheaved several thousands of feet, is as recent as the Middle Tertiary or Pliocene period. That of the Arabah Valley in Arabia Petræa, which has been traced for about 400 miles from the Gulf of Akabah into Syria, has an uplift of about 4,000 feet where it passes along the eastern margin of the Dead Sea and is of the same age; and, to come nearer home, the fault which bounds the great plain of Cheshire on the east side at the foot of Mowcop, in North Staffordshire, has a displacement of about 3,000 feet. But what is remarkable is, that the two former

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showed how valuable to many a professed student of science was some real knowledge of the philosophy of Mill and Bain, as a safeguard to specialists outside their own line of work.

Having said so much by way of appreciation of the paper as a whole, he hoped the author would pardon him for a little friendly criticism of one or two minor points. He speaks of "the atoms ranging themselves into the elements." The atoms, however, *are* the elements. Did not the author really mean "electrons"?

Again, the phrase, "the daily miracles of nature in the animal and vegetable world," reminded the speaker of a remark which he heard Lord Kelvin make three or four years ago at University College, in the discussion of a lecture on "Darwinism" by Professor Henslow. Lord Kelvin remarked that every blade of grass and every living thing is a "miracle," when viewed from the standpoint of physics; and quoted a saying of the great chemist Liebig to him years ago, that he no more believed that the grass and flowers they then saw around them came to be what they are by a "fortuitous concourse of atoms, than he believed the pages of a text-book of Botany in which they were described, came into being by such a process." The speaker was glad to see that the *Unseen Universe* was a book not entirely forgotten, and instanced an illustration, given by the authors of that work, of the intervention of Will or Volition in determining the results, when a man pulls the trigger of a gun or pistol; where an act of the human will directs mechanical force to the generation of heat and the consequent rousing into activity of the latent energy stored up in the powder.

While in general agreement with what the author had said on the six points enumerated he thought the definition given of "Miracles" about the safest definition that can be given. But he must take exception to the author's introduction of the word "supernatural" into the discussion. Though a favourite word with theologians of a certain type, it was a foolish word: it involved *petitio principii* in an argument, because it assumed that we have clear and definite knowledge of what are the limits of "the natural."

As to Hume's ideas, they were a creditable and honest attempt *at the time* to think out these matters; but they were put forward by a man who lived (we might almost say) in pre-scientific days, and

therefore their value was to be largely discounted in the light of our more extended knowledge, not only of phenomena but of the occult forces of nature. To give more definiteness to his criticism of the word "supernatural" (and to a less extent of the words "preternatural" and "superhuman"), the speaker quoted from a paper privately printed some four years ago as a *critique* of the position taken up by the Dean of Ripon on the dogma of the Virgin Birth, in which he had preferred the word *preter-scientific*, as one which the evolutionist might safely use in speaking of the possibility of an influence of mind and will leading gradually to results, in which the moral and spiritual is seen to dominate the material. Here we recognise the principle of *directivity* in the order of nature. Such a term might be called unscientific, but it was not *anti-scientific*; that is to say, did not of necessity involve a breach of the *law of continuity*, of all the factors of which Science could not claim certain knowledge. Sound logic requires us to discriminate between "the contrary" and "the contradictory."

This leads us up to the "wonderful works" of Christ, of which he wished to speak with the more emphasis in view of some things contained in the address given by Professor Silvanus Thompson to the Institute a year and a half ago. In the first place it was well to notice that the "miracles" of Christ were *never tentative, never experimental*; you never find Him making an experiment on the human or any other subject. Whether we take the Gospels as they stand, or the testimony of His "Witnesses," the Apostles, the Christ of the New Testament is presented to us as One in whose whole life and work and teaching preter-scientific powers exhibited themselves. This is put forward with especial emphasis by St. Peter in Acts ii, 22 (where he challenges his audience to contradict his statements of fact), and by St. Paul in Romans i, 4, who speaks of Him (in his greatest epistle) as One "declared to be the Son of God with power," by the evidence of His life and resurrection. We cannot get away from the fact (everywhere patent in the Gospels) that our Lord staked the truth of His teaching on *powers inherent in His Person*, such as have never been exhibited by any man before or since; and above all He appealed repeatedly to the evidence of His resurrection before that was an accomplished fact. And when we think of the palpable and unmistakable evidence furnished in the Gospels, it is surely impossible for the mind of any fair and candid person to

explain away the fact that our Lord's human consciousness was penetrated through and through with the knowledge that in Him there were inherent powers more than human. So that, if men say that "Christianity is Christ," while they refuse to recognise the very basis upon which He claimed to rest His authority, the "Christ" left to them is an emasculated Christ, and not the Christ of the Gospels and of the Church.

In his seventh Bampton Lecture, Archbishop Temple remarks:—

"It is not possible to get rid of miracles from the history of the Apostles. They testify to our Lord's Resurrection as an actual fact, and they make it the basis of all their preaching. They testify to our Lord's miracles as *a part of the character of His life.*"

This brings us to the argument elaborated years ago by Paley, whose book still holds its ground in the ancient University of Cambridge.

Lieut.-Colonel G. MACKINLAY.—This excellent paper comes at an opportune time. The illustration of the child and the falling leaf appears to give the most probable explanation of miracles—no breach of natural law, but another kind of force brought into play.

Again, the Canon remarks on the *timing* of certain wonderful events in Scripture; this appears to be a salient feature with many of them, not only with those which may have been performed by agencies familiar to us, but also with others in which the agency was certainly supernatural, for instance—

(a) When the Saviour was dying the light of the sun failed (the sun failing, Gk.) Luke xxiii, 45; Christ had been called the sun prophetically (Is. ix, 2; Mal. iv, 2), and He had proclaimed Himself under the same figure, when He said, "I am the Light of the World" (John viii, 12; ix, 4, 5).

(b) The miracle of the resurrection took place at about the time of the vernal equinox, when the power of the sun on the earth is most rapidly increasing. This miracle was also timed to occur on the day when the first-fruits were presented before the Lord "on the morrow after the Sabbath" (Lev. xxiii, 10, 11) after the Passover, and this coincidence is alluded to in 1 Cor. xv, 20, 23.

(c) The Ascension took place when the moon of the month following that of the Passover was fading from the sky, for it was some forty-three days (Matt. xii, 40, Acts i, 3), after the Crucifixion,

which was at full moon; the disappearing moon at the Ascension was thus a sign of the departure of Christ from the earth. This is in accord with Gen. i, 14, where it is stated that the two great lights are for "Signs" as well as "for seasons and days and years."

(d) The miraculous outpouring of the Holy Spirit when the Church began its existence (Acts ii, 1-4) was timed to take place on the day of Pentecost. On the same day the law had been promulgated by Moses—the practical beginning of the first dispensation.

It has often been suggested that the Nativity took place on the first day of a feast of Tabernacles, the fifteenth day of the seventh month, one day after full moon; but want of space prevents us from enumerating the inferences which support this view. Let us assume, however, that it was so.

(a) The Annunciation to the Virgin Mary must have been some forty weeks before the Nativity, and so it could well have been at the holy day of the new moon of the tenth month of the previous year, about the middle of December, when sowing took place. A sign of a new beginning was thus given in the heavens, and the sowers unconsciously proclaimed the same on earth.

(b) As John the Baptist was five to six months older than Christ (see Luke i, 13, 24, 26), his birth must have been in the month following the Passover (for that feast and Tabernacles are six months apart), just before the harvest was reaped—a time of want to the poorer classes, as the stores of corn of the previous year then ran very low. Christ on the other hand was born (we have assumed) at the glad feast of Tabernacles, when all the fruits of the earth had been gathered in. The condition of things at the birth of the forerunner and of Christ thus harmonised with their characters described in Matt. xi, 18, 19: "John came neither eating nor drinking . . . the Son of Man came eating and drinking."

Several miracles (five or six at least) during Christ's ministry were specially appropriate to the times at which they took place; for one instance, the feeding of the five thousand was certainly (as the birth of John was probably) at a time shortly before harvest (John vi, 4-14), when consequently the need was greater than usual.

This appropriateness of the seasons at which the births of John and of Christ and the feeding of the five thousand took place is

intensified in each case by the very probable circumstance that each event came in a year which followed a Sabbath one, when there **was** no sowing and practically no harvest ; but want of space prevents our giving the historical data to support this assumption.*

Rev. W. F. KIMM, M.A.—It has been objected against miracles that they are violations of law, and therefore inconceivable in a universe planned with perfect wisdom and foreknowledge.

The paper has shown that this is not the Scriptural idea of miracles.

Moreover all men know that there are laws and laws, and that some "laws of nature" are sometimes contravened or controlled or superseded by others.

The skylark soars upwards, beating the air with its wings, and the air presses back with a pressure due to the weight of the air, which is due to gravitation, and so the bird is pressed up and up, until suddenly it folds its wings and then it falls under the action of gravitation. The same law which serves to bring the bird to the ground, serves to raise it to the clouds when the nervous and muscular energy and the will of the bird are brought into play.

The "laws of nature" are matters of human discovery, and men are still discovering, and it is highly probable there are many laws yet to be discovered ; so that the objection to miracles on the ground of the unchangeableness of law must stand aside until we know all laws and all their interactions.

But when we seek to discover the scriptural idea of miracles we find mention of laws of another kind, which are from the scriptural point of view laws indeed, being the express declaration of the mind of the Lawgiver and not mere inferences deduced from an imperfect observation of His works.

These are referred to in the paper more or less directly among the cases "which natural science is not in a position to fathom."

The "laws of nature" which are merely customary modes of procedure in nature may be compared to common law which is merely custom and often difficult to determine for lack of evidence.

* The subjects briefly alluded to here will be found fully considered in a book shortly to be published entitled, *The Magi ; how they recognised Christ's Star*.

But we have also Statute Law which supersedes common law whenever the interests of the State require it.

Such a supreme law we find set forth in the Scriptures, and miracles are always linked in with some declaration of the divine will, or they take place as answers to prayer, according to the gracious laws which regulate the intercourse of the heavenly Father with His children.

In neither case is there any violation of law, but a fulfilment.

MR. M. L. ROUSE.—Science constantly brings us to a borderland where wholly secret forces are in operation. As I heard Lord Rayleigh say in an address to the British Association, after he had alluded to the “life-long beliefs of Newton, Faraday and Maxwell.” “In his heart the man of science knows that underneath the theories that he constructs there lie contradictions which he cannot reconcile. The higher mysteries of being, if penetrable at all by human intellect, require other weapons than those of calculation and experiment.”

Chemical affinities are still a mystery ; and so is the impalpable, imponderable ether, which transmits the electric current and light when air is altogether absent. But what of life, with its marvels of nutrition, growth and reproduction—the nutrient fluids, as the late Professor Beale delighted to tell us constantly working against gravity; the creature (as he showed us in the case of a caterpillar) developing day by day out of a drop of liquid in which no microscope can detect any structure at all ; and every normal plant and animal having stored up within itself and one within the other a creature of like form to its parents for a thousand generations ? Paley likened a living creature to a watch, and appealed to the sceptic to acknowledge that it equally required a purposeful maker ; but what should we say of a watch that had stored within itself, barrel within barrel, a thousand machines ready to take its place one after another ?

If the original gospel that our modern rationalists speak of really existed in the first century and the four gospels were introduced in its place, as they make out, at the beginning of the second century (when, as we gather from Tacitus and Pliny, there were about a million Christians in the Roman world), do we suppose (knowing upon what far slighter grounds Christian sects have been readily formed) that a sect would not at once have sprung up contending for the use of the original Gospel in its simplicity ?

Professor ORCHARD.—All religion is based upon the supernatural, and in the case of Christianity, the supernatural involves the miraculous. Eliminate the supernatural, and (as we are reminded on p. 75) there will be no Gospel left worth preaching or believing.

A miracle may, I think, be defined as an unusual manifestation of supernatural power. As pointed out by the author, Christ is Himself "the miracle of miracles." Renan has justly remarked that the character of the Lord Jesus is such that it could not have been invented—"It would require a Jesus to invent a Jesus."

The miracles which He wrought were always attestations to His mission and teaching, that men, believing in Him, might have life through His name.

The SECRETARY wished to join in his expression of gratitude to the author, not only for the paper but for the willing manner in which Canon Girdlestone had undertaken to prepare it, when it was suggested to him on the occasion of a meeting which took place at Whitby last summer. Such papers as that now before the meeting could not fail to be helpful to many anxious minds, tending to strengthen faith in the miraculous statements both of the Old and New Testaments, and particularly at a time when indifference and unbelief is unhappily prevalent in society. Knowing how full of work is Canon Girdlestone, he (the Secretary) felt it was especially kind in him to undertake a task which must have added much to his labours.*

A warm vote of thanks was then passed to the author, who replied to a few points raised in the debate, and the meeting separated.

* In reference to the miracle of the raising of Lazarus from the dead, which to us seems one of the most notable, and was certainly one of the most publicly recognised, it may be suggested that our Lord exercised his power rather to preserve the body of Lazarus from decomposition than to raise it to life after decomposition had set in. The statement, a very natural one of Martha (John xi, 39), was not assented to by the Saviour, who always adopted the simplest means in carrying out His gracious purposes. Having from the beginning determined on calling Lazarus from the grave He would in accordance with this view have adopted the simpler course above suggested.—ED.

ORDINARY GENERAL MEETING.*

LIEUT.-GENERAL SIR H. L. GEARY, K.C.B. (VICE-PRESIDENT)
IN THE CHAIR.

The Minutes of the last Meeting were read and confirmed.

The following paper was read by the Author :—

THE PEDIGREE OF THE NATIONS. No. II.

By M. L. ROUSE, Esq., B.L.

IN presenting the Institute with a second paper upon the Pedigree of the Nations, it was my intention to go on reviewing the respective progenies of the sons of Japhet in the order wherein these are given in the Tenth of Genesis. But, when I began to investigate more seriously than I had hitherto done the parentage of the nations of Central and Eastern Asia, I met with a problem as to the distribution of the families of Magog and Tubal which I saw that I could not properly solve and set forth before the appointed day. Therefore, in preparing this paper, I have departed from the Bible order; and, since I have already dealt with the peopling of Europe by two great families of Japhet, I have examined and shall bring before you the migrations of another that has both peopled our own continent and largely stocked the adjoining regions of Asia and of Africa.

After reading my former paper, in which I determined the position of the eastern branch of the race of Ashkenaz—the earliest Saxons—as around the southern quarters of the Caspian Sea, I remembered that just north of the Ascanimian Mountains, which ran eastward from the southern coast of that sea, there had stood from a remote period the town of Askabad; and the thought struck me, might not this contain

* Monday, February 4th, 1907.

the name of Ashkenaz, worn down by the ages and prefixed to the common Persian ending *-abad*, or *abode*. A traveller, writing recently to the *Daily Chronicle* from the region had, however, analysed the name into *Abode of Love*. I wrote, therefore, to Canon Robert Bruce, the Persian scholar, and to Dr. St. Clair Tisdall, the Turkoman scholar, asking first whether the latter etymology was correct, and next whether *Ask-* could be a proper name. In reply, I learnt that the name could not mean *Abode of Love*, seeing that *ishq*,* the Arabic word for sexual love, which was in question, would have become *ashq** in Persian and *ishiq** in Turkish or Turkoman; and Turkish or Turkoman, not Persian, has always been the language of Askabad since Arabic began to spread along with Mahometanism: while Canon Bruce opined that *Ask-* was a proper name, and Doctor Tisdall thought that this syllable was either an old and rare Persian word meaning *messenger* or else a proper name. And, upon my then writing to ask the latter whether Ashkenaz might have been thus abridged, he replied that he thought it possible, just as Bedford had been cut short from Bedanford, and that again, as he might have added, from Bedcanford. In confirmation of my conclusion that the first progenitor of the Phrygians and Armenians really was Thogarmah, brother to Askenaz, the father of all the Teutons, and to Riphath, the father of all the Kelts, Doctor Tisdall further wrote that he had observed in the Armenian language a greater resemblance to Keltic than to Persian speech.

And I think that it will interest all English folk present to-day, if I tell one more discovery upon the subject of my last paper—a discovery that bears upon the migration of the Saxons across Europe. The *Anglo-Saxon Chronicle* gives pedigrees for the founders of the five kingdoms of the heptarchy or octarchy—namely, Kent, Wessex, Mercia and Northumbria, in its two divisions of Bernicia and Deira; and in all five the ancestry is traced back to Woden, from whom, the *Chronicle* states, every royal house in England was descended.

The pedigrees are thus traced backward:—

1. From Hengist and Horsa, who landed in England about 452 A.D.,† back to Wihtgils, Witta, Wecta and Woden.

* That is, more phonetically, *ishkh*, *ashkh*, and *ishikh* (here, but usually q = gh).

† Their landing to help Vortigern against the Picts and Scots is placed "in the days" of Marcian and Valentinian, who reigned from 449 A.D. for "seven winters," and their defeat of Vortigern at Aylesford after they turned against him is dated in 457.

2. From Cynric, who succeeded his conquering father in Wessex in 534 A.D., back to Cerdic, Elesa, Esla, Gewis, Wig, Freawin, Frithogar, Brand, Baldaeg and Woden.
3. From Penda, who began to reign in Mercia in 626 A.D., back to Wybba, Creoda, Cynewald, Cnebba, Icel, Eomer, Angeltheow, Offa, Wearmund, Wihthlaeg and Woden.
4. From Ida, who began to reign in Bernicia in 547 A.D., back to Eoppa, Esa, Ingwy, Angenwit, Aloc, Beonoe, Brand, Baldaeg and Woden, and further back to Fritholaf, Frithowulf, Finn, Godwulf and Geata.
5. From Ælla, who acceded in Deira in 560 A.D.,* back to Yff, Uscfrea, Wisgis, Westerfalen, Saefugl, Saebald, Sigegat, Swaefdaeg, Sigegar, Waegdaeg, and Woden.

That these pedigrees are not fanciful is evidenced by the following features borne by them :—

That Woden, though worshipped as a god, is himself credited with a human chain of ancestors.

That two pedigrees and no more have links in common, and those in the two generations next after Woden.

That the number of generations greatly varies, and 'yet there is no attempt to make the interval back to Woden the same in length by omitting or adding generations according as the starting point was less or more distant from him; and yet that, if thirty-three years be assigned to each generation, we are brought for Woden by all but pedigree 1, into a period of sixty-six years (between 197 and 263 A.D.), or less than the span of a normal human life.†

Again, if we use more latitude, and allow thirty years apiece to the generations in pedigrees 2 and 5, but thirty-three in the other two as before, we shall narrow the period to thirty-three years—between 230 and 263 A.D. Thus :—

534 A.D.	less	(10 × 30 =)	300 years	=	234 A.D.
626	"	"	(11 × 33 =)	363	" = 263 "
547	"	"	(9 × 33 =)	297	" = 250 "
560	"	"	(11 × 30 =)	330	" = 230 "

* And afterwards became lord of all Northumbria (Haydn).

† It cannot have been invented for him in Christian times, else it would either have been inserted in every pedigree or else in the first, not in the third, as Ida's is in the original.

Since pedigree 1 is introduced at a date 80 years earlier than any other in the Chronicle, and this was certainly not entered up in Hengist's own time, from the adverse way in which it sums up his behaviour, and could hardly have been regularly kept, being a West Saxon record, until government in Wessex became settled in 534 A.D., we may well think that some of the links in Hengist's pedigree had meanwhile been lost; yet it is not impossible, even if we take this pedigree as we find it, to bring Woden into the same period as we have just done, if we suppose that each son in the chain was on an average born when his father was forty-eight years old.

Now it is in 287 A.D., or 24 years after the close of our period, that the first notice of the Saxons occurs in any known Latin or Greek author; and we then learn that in that year Carausius, who had been appointed admiral of the Roman fleet to guard the shores of Belgic Gaul and Armorica* against raids made by them and the Franks, being accused by the Emperor Maximian of enriching himself instead of the treasury with recovered booty, saved himself by seizing the government of Britain and proclaiming himself emperor there.† It must have been about a generation before his time that the Saxons reached the mouths of the Elbe and the Weser, and thus found harbours whence they could sail forth and prey upon the coasts of Northern France and Brittany; and this brings us to the period when, as we have just seen, Woden was flourishing. Now he must have been made a demigod both in England and Germany for some great exploits; and the fact that most of the pedigrees are traced back to him and no further shows that his life began a fresh era in the history of his nation; we may therefore conclude beyond doubt that it was he who led the Saxons in their warlike migration from their first home beyond the Caucasus across Scythia and into Northern Germany.

TIRAS.

The descendants of Tiras and Javan, as I hope to show, formed the remaining elements in the population of Southern Europe down to the first Moslem invasion, which infused Arabian and Libyan blood into many districts of Spain and into the islands of the Mediterranean Sea; and I shall deal with Tiras first, although he was the younger brother, because his

* Later on called Brittany.

† Eutropius, *Brev. Hist. Rom.*, ix, 21; Orosius, vii, 25: cp. Sext. Aurel. Victor *De Vir. Ill.* c. 78, and *Épit.*, c. 39.

descendants preceded those of Javan in the westward march and advanced much further.

His name in the original text of Holy Writ, where it occurs only twice—here (in Genesis x, 4) and in 1 Chronicles i, 5—is each time spelt with the aspirate, and may be phonetically written *Thirās*. Josephus says that he was the ancestor of the Thracians: let us see. And first, as to spelling: the common Greek form of the name for the Thracians' country was *Thrakē*, with the iota subscript, which denotes that it was once written *Thraikē*; and as *Thrēikē* (with Ionic modification) it appears in Herodotus, while both Homer and Herodotus call a Thracian *Thrēix*. Now *-ikē* is the feminine adjectival ending which agrees with *hē gē*, the land, understood; therefore the full name would mean *The Land of Thra*.*

In the time of Herodotus (B.C. 450) the name was applied to the whole territory that stretched northward from Macedonia† to the lower course of the Ister, or Danube,‡ north-east of which, however, lay the tribe of the Agathyrsi,§ whom he assigns to no special stock, but describes as having customs greatly resembling those of the Thracians.|| Beyond the mouths of the Ister, the land, eastward as far as the Tanaïs, or Don, and northward for an equal distance, was occupied by the Scythians.¶ But it will be remembered that, as told by both Herodotus and Strabo, these Scythians were invaders, who had displaced the Kummerioi; and in the days of those earlier settlers Thrace may have extended further still; and the next river of importance east of the Ister and only sixty miles away, now called the Dniester and intermediately the Danastris, bore in Herodotus's time and before that the name of Tyras,** whose sound reminds us vividly of the patriarch in question, while at its mouth stood for ages a town bearing the same name. The town was regarded as a

* As a parallel we find in Her. IV, 99, "Before the Scythic land (*tēs Sküthikēs gēs*) lies the Thracian (or Thrace), *hē Thrēike*; and, this land sweeping round, Scythia (*hē Sküthikē*) succeeds it, the Ister at this point emptying itself with its mouth towards the east wind." Just below he speaks of *hē Sküthikē khora*, the Scythic country, but otherwise almost everywhere simply of *hē Sküthikē*; only once, so far as I know, as *Sküthiā* (Ionic for *Sküthia*).

† Her. V, 2, 3-9.

‡ Id. IV, 93, 99.

§ Id. IV, 100, 48, 49: though he places them next to the Scythians on the north, he makes the Maris, or Maros, an eastern Carpathian river, arise in their territory: and in c. 51 (cp. 100) he really makes the upper Tyras their northern boundary.

|| Id. IV, 104.

¶ Id. IV, 100, 101.

** Herodotus spells it Ionically *Tyrēs*, but Ptolemy and Strabo *Tyras*.

Greek colony; but of course it took its name from the river, just as Isca Dumniorum (Exeter) took its name from the river Isca, or Exe, and as Isca Silurum (Caerleon) took its name from the Isca, or Usk. The territory of the Kimmerioi, which the Scythians appropriated, had indeed extended to the Tyras; for they buried nigh to its eastern bank the bodies of their royal clan when it fell in the civil broil that ensued on the Scythian invasion*: but, large river as it was, the Tyras may well have formed the boundary of a nation whose centre was the Crimean peninsula, as is shown by their having protected this with a long rampart†; and, if so, the Thracians would certainly at that time have been spread over the sixty-mile space between the estuaries of Ister and Tyras.

But were they not spread there even in Herodotus's own time? It is remarkable that, when beginning to describe Scythia in detail, he says, "Starting from the Ister, I shall now describe the measurements of the seashore of Scythia. Immediately that the Ister is crossed, Old Scythia begins, and continues as far as the city called Carcinitis fronting towards the south wind and midday."‡ Now by Old Scythia he could not have meant that part of the Scythians' dominion in which they originated; for he had already given his opinion that they had wandered from Asia and crossed the Volga when they attacked the Kimmerioi and took their place in Southern Russia§; and elsewhere he states that the Sacae, who dwelt by the Bactrians and Caspians—that is, in Turkestan—were a branch of the Scythian race||. Therefore by the phrase in question he must have meant a part of Scythia that used (in his opinion) to be occupied by Scythians, but was now filled with other tribes, though tribes that obeyed Scythia's king. Again, Strabo says that the Getæ and the Mysi, two Thracian tribes, were dwelling on both sides of the Ister, when some of the Mysi came southwards and eastward and conquered the region in Asia, which was in his time called Mysia¶. But in the latter statement he must have referred to a real or fancied migration many centuries before his own time**; since the Mysi were already in Asia when Xerxes invaded Greece, in B.C. 484, and marched in his army, clad and accoutred as Herodotus describes them. Thus Strabo, who was of course thoroughly familiar with Herodotus's

* Her. IV, 11 (*cf.* Bible Pedigree I, 5-7).

† Strabo XI, ii, 5, and B.P., p. 6.

‡ Her. IV, 99 (Rawlinson's Transl. *verified*)

§ *Id.* IV, 11.

¶ Strab. VII, iii, 2.

|| *Id.* VII, 64 and III, 93.

** (B.C. 10.)

account of the invasion, must have intended to place the settlement of those Thracian tribes beyond the Ister at a period long anterior to the fifth century B.C. But, according to Herodotus, it was only in the early part of the seventh century that the Scythians took the place of the Kimmerians.* We may therefore safely conclude that Thracian tribes were dwelling on both sides of the Ister up to the Tyras when the Kimmerioi occupied southern-most Russia, and that by Herodotus's time they had pushed their settlements along the coast up to Carcinitis—that is, about three times as far.

The Kimmeric name for the river was, as we have seen, the Danaster: the name Tyras must therefore have been Thracian; and what more natural than that the Thracians should bestow the name of their ancestor upon their boundary-stream! And his name it is, with such simple phonetic changes as always occur in the lapse of a few centuries: thus the Teutonic sharp *th* has become *t* or *d* in all the Teutonic languages† except English and Icelandic: while *y* in English, which used to be sounded, as it still is in Swedish, like the French *u*, has become *ε*, first with either the *æ* or the *ɪ* sound, and then very often with the sound heard in *bite*.‡ The Russians have since drawn the name back closer to its original form; for, in succession to the city Tyras, they have a city about seventy miles up the stream called Tiraspol.

We may note on the coast of Thrace proper, a headland called Tiriza, or Tiristis, and a town called Tiristasis. But now we turn southward, and find that the Thracians had in classic times penetrated nearly as far from the Propontis, or Sea of Marmora, in that direction as the Ister is in the opposite direction. Thus Herodotus tells us that the king of Crestonia, who refused submission to Xerxes, was a Thracian,§ Mela (about B.C. 40) describes Chalcidice as part of Thrace,|| and Strabo declares that in his time (about B.C. 10) the Thracians were occupying Macedonia and part of Thessaly.¶

Unless indeed the Thracian people, known to us under another name,** at one time possessed the whole of Greece, the

* Her. I, 15, 16 (Ardys reigned 674–626, Alyattes 615–559).

† Cp. e.g. the Anglo-Saxon *thank* and *thyn* or *thin*, Eng. *thank*, *thin*, Swed. *tack*, *tün* (= *tün*) and Ger. *dank*, *dünn*.

‡ Cp. A.-S. *mys*, *fyllan*, with E. *mice*, *fill*, and the changes already noted in the names of the descendants of Gomer, whose name must in turn have been pronounced Gomer, Gümer, Gümer and Gümmer, Gimmer, Kummer, Kimmer, Kimber, and Kumber. (See also Final Notes.)

§ Her. VIII, 116.

|| Mel. c. ii.

¶ Strab. VII, vii, 1.

** See pp. 98–99.

river Titaresios in Northern Thessaly, with its remarkable alternative name of Europus, probably marked the limit of their advance as a nation southward,* just as the Tyras for a long while marked the limit of their advance northward. It is strange that each time this name Europus occurs upon our continent—twice for a town and once for a river—it is in Macedonia or Thessaly, within the Thracian sphere; and where it occurs upon another continent, it has simply been transferred through the Macedonian conquest of Western Asia, displacing the older names—Rhagae, Carchemish, and Dura.

Whence had the Thracians come ere they spread thus northward and southward in the Balkan peninsula and beyond?

There were Thynians in Thrace, and Thynians and Bithynians in Asia, at the time of Herodotus and of Strabo; and these writers concur in calling them one Thracian people. Strabo ranks their next Asiatic neighbours, the Mygdones, also with the Thracians; and both he and Herodotus speak of Mysi in Thrace and Mysi in Asia, Strabo calling them a Thracian tribe, as we have seen.† Lastly, Herodotus calls the Mysi colonists of the Lydians, and states that in Xerxes' army they marched under the same commander, Artaphernes‡: while elsewhere he gives the tradition of the Carians that they, the Lydians, and the Mysians were brother-peoples, descended from three brothers Car, Lydus, and Mysos; in proof of which they showed in their own country§ a temple of the Carian Zeus, in which the three nations had a common right of worship. The historian adds (and surely he well knew, since his native town of Halicarnassus was only fifty miles away): "These truly have the right; but men who belong to any other nation, even if they have come to use the same language as the Carians, do not share the right with them."||

Yet that a large and original element in the population of Lydia could not have been descended from Lydus is elsewhere proved by our author himself. The people of Lydia, he tells us in another passage, were originally called Maeonians¶; and Homer, who nowhere speaks of Lydians,** tells of a contingent of Maeonians who came to fight for King Priam of Troy from

* Cf. p. 96 foot; p. 107 end.

† Her. I, 28; VII, 75; Strab. VII, iii, 2.

‡ The Carians were not under the same command, simply because they were a sailor-folk and furnished seventy ships with fighting crews to Xerxes (Her. vii, 92).

§ At Mylasa, an inland city of theirs.

|| Her. I, 171.

¶ Her. I, 7.

** *Ibid.*, note by Rawlinson and Grant.

the Gygaean Lake and the foot of Mount Tmolus*—well known features of Lydia.

The Maeonians took the name of Lydians, our author adds, from Lydus, son of Atys; who reigned a long while before 1217 B.C., the date of the accession of Agron ascertained from Herodotus's chronology;† though it is far more likely that they as Maeonians were then conquered by a tribe bearing the name of Lydians; and that there was such a tribe previously dwelling to the east of them and descended from Lud, the fourth son of Shem, I hope on a future occasion to show.

The Carians claimed to be aborigines of Caria. The only other account that we possess of their origin—that given by the Cretans‡—makes out that they formerly dwelt in Crete under the name of Leleges, and that there under King Minos and his successors they became the most famous warriors in the world, as well as the inventors of crests upon helmets, leather handles for shields, and the first devices upon shields; but that they were at length driven out by the Ionians and Dorians. Thucydides, however, really supports the former account, besides showing how the race spread in the early ages, when he states and gives strong evidence, that before the time of Minos the "Carians" (not Leleges) settled most of the Ægean Islands, but were great pirates, until under the sailorly Minos navigation improved between them, and he compelled those who still carried on piracy to emigrate.§

In either case, the Carians did not form part of any conquering race called Lydians; and we must therefore conclude that they were a brother people to the Maeonians—a conclusion that is confirmed by the fact that Herodotus describes as Maeonians a people living in the mountains on the side of Caria remote from Lydia, the Cabalians;|| so that beyond doubt the foundation stock of both Lydians and Carians was Maeonian.

Now, just as we found the only local names from which the term Europe could have spread to have originally been bestowed upon a river and two towns within the sphere of Thracian settlement in Europe, and not far from where the Thracians must have first passed over to our continent, so do we find the only local name from which the term Asia could have spread to have originally belonged to a tribe in Thracian Lydia—the

* Hom. *Il.*, II, 864-6.

† Her. I, 171.

‡ Cp. Her. I, 7, 13-16, and 25.

§ Thuc. I, 8.

|| Her. vii, 72.

tribe called *Asias* at Sardis.* The Lydians indeed claimed that the tribe and the continent both got their names from *Asieus*, a nephew of *Atys*, their first King †; which amounts to saying that he gave his name to the tribe, who were his descendants, and to their territory (as was likely enough considering its small relative size and the great length of time that had intervened), and that they passed it on as the name of the eastern shore of the *Ægean* Sea, the intercourse of divers nations across that sea gradually causing the name to be applied to all lands however remote that lay eastward of the *Ægean*. It was natural indeed that the Thracian people, which was the first to occupy opposite sides of the *Ægean* and hold them concurrently for ages, should be the first to bestow on the two continents their respective names.‡

In the reign of *Atys*, the father of *Lydus*, and therefore while the inhabitants of *Lydia* were still all *Mæonians* or of Thracian blood, a famine befell the country, as *Herodotus* narrates, the scarcity lasting eighteen years, until at last the King made his people draw lots for half of them to stay in their native land and half to emigrate; and those upon whom the lot fell to depart went down to *Smyrna* under the leadership of the King's son *Tyrsenos*, built ships, and sailed away past many settled countries until they reached *Umbria* (in north central Italy). Here they landed and built cities, and changed their national name, calling themselves after their leader "*Tyrsenoi*."§

Now, whereas *Herodotus*, like *Hesiod* and the lyric *Homer* before him,|| calls a certain great Italian people *Tyrsenoi*, the later Greek writers call them *Tyrrhenoi* (*Tyrrhenians*), and after them the sea that lay west of Italy the *Tyrrhenian* Sea; the phonetic change being like that of *khersonesos* (peninsula) into *kherrhonesos*,¶ or like that of *porso* for *proso* (onwards) into *porro*.

* *Her.* IV, 45.

† *Ibid.*

‡ The other supposed origin of the term *Europe* from the corrupt myth of *Jupiter* and *Europa*, *Herodotus* dismisses on the ground that *Europa* was a *Tyrian* woman, who wandered to *Crete* and to *Lycia*, but never reached our continent (*ibid.*); while the derivation of *Asia* from the like-named wife of *Prometheus* we may equally dismiss on the ground that the deeds of *Prometheus*, if they are anything but fabulous, point to a period before the Flood.

§ *Her.* I, 94.

|| *Ibid.*, and 163; *Hes. Theog.*, 1015-6; *Carm. Homericæ*, vi, 6-8.

¶ And the original *Chersonesus* was the Thracian one, beside the *Hellespont*.

The main part of the story is doubtless true; the early Lydians, who, as we have seen, were the same as the Carians, must have been venturous seamen; and it is remarkable, when we remember the name of the Lydian capital, Sardis,* that the next land to the southern part of Tyrrhenia is the great island which the Greeks called Sardo (Sardinia). That it was Sardinia rather than Tyrrhenia, or Etruria, itself that was colonised by those Lydians may perhaps be inferred from the strange utterance of Histiaios of Miletos to King Darius Hystaspes on a memorable occasion: when the king wrongfully reproached him with the loss of Sardis, which had been captured and burnt by a Grecian force during his attendance at Court, he said that, with royal permission, he would return to the Ionian coast, quell the outbreak, arrest his careless or treacherous deputy, and not change his tunic until he had made tributary to the king, Sardo, the biggest island in the world.†

But, again, we find in Lydia, in the valley of the Cayster, in what must have been the very centre of the country when Lydia and Caria formed one state—in old Maonian or Thracian times—a town called by the Greeks Tyrrha,‡ and therefore most likely in more ancient times, Tyrsa; so that the emigrants to Italy may well have borne the name Tyrsenoi ere they started. That this name enfolds the name of the Bible patriarch and links together the Thracian stock in another direction, we shall presently see.

We have seen that the people of Etruria or Tuscany were called by the early Greeks Tyrsenoi; by the early Romans they were called Etrusci, and by themselves in classic Latin times Rasena.§ Combining *Tyrsenoi* with *Rasena*, we find that the original name must have been *Tyrasena*; and, as *-ci* was a common ethnic ending in Latin like *-ici* in Greek, and as the initial *E*-disappears in the later Roman form *Tusci*|| and is therefore probably a mere determinative, there is nothing in *Etrusci* to militate against this conclusion. *Tyrasena* was therefore the pristine name of this people.

"When Rome was in its infancy they were a very powerful nation, with dominions extending from the Alps and the plains of Lombardy, on the one hand, to Vesuvius and the Gulf of

* Properly *Sardeis* and declined as a plural word, and so doubtless denoting the original tribe. † Her. V, 106.

‡ And now *Tira*. § Dionys. Halic. (B.C. 7) i. 30, *Παρίνα*, var. *lect. Παρίνα*.

|| On the Engubine Tablets they are called *Tursci* (*Lepsius, Tablets III, 17, Inscript. Umbr. et Osc.*, p. 15).

Sorrento, on the other. These dominions may be divided into three great districts, Circumpadane Etruria in the north, Etruria Proper in the centre, and Campanian Etruria in the south; and in each of these districts there were twelve principal cities or states, which formed a confederacy for mutual protection. But through the attacks of the Gauls in the north and of the Sabines, Samnites, and Greeks in the south, the Etruscans became confined within the limits of Etruria Proper.

"Here, however, they continued long to flourish. They were a highly civilised people; and from them the Romans borrowed many of their religious and political institutions."* To this abstract from Smith's shorter classical dictionary, one might add that the Etruscans were noted for their beautiful designs on pottery, and that the first Etruscan, king of Rome† carried out a grand piece of engineering there—the making of the great drain—which has stood until this day.

Besides the name that it bears itself, we find at least two local names in Etruria enwrapping the primeval patronymic Tyras; for in the Hirpinian territory, just to the east of Vesuvius, stood in early classic times the town of Taurasia,‡ and in the midst of Etruria Proper stretched for 16 miles each way the great lake Trasumenus.§

Again we find among the Taurini—a Ligurian tribe, as both Strabo and Pliny distinctly say—the city of Turin, which under the emperors was called Augusta Taurinorum, but more anciently Taurasia. Now mountain tribes are the most tenacious of their nationality; they appear to prize independence more than do dwellers upon plains, while their lands are less coveted by conquerors: hence they often remain unmixed in race and continue to use their own pristine language and customs, while their former countrymen of the plain have exchanged theirs for a richer but more anomalous medley of tongues, and for customs more refined, but sometimes less innocent. For illustrations of this, our minds turn to the Highland Gaels, the Welsh, and the Basques, who have all retained their languages and many of their customs through the lapse of many ages. We have just had an indication that the Taurini long maintained their identity as part of the race of the Tyrasena; let us now turn westward to other mountaineers. And first, the name Raeti reminds us of the Rasena, with whom

* Smith's *Sm. Class. Dict.*, "Etruria."

† Tarquinius Priscus.

‡ The modern village Taurasi records its name.

§ Now called Trasimeno.

like the Taurini, they were once contiguous, and, as Roman writers say, had formed one people.* As a fact, what name do we now find borne by the land of the Raeti?—Tyrol. The Raeti, like the Rasena, had thus evidently dropped their first syllable. Re-add it, and you get Tyraeti or, pursuing the analogy further back, Tyraseti. Passing along the Tyrolese mountains, we reach the southern part of Noricum (Carinthia and Styria), which, as we learn from Strabo, was settled by the Celtic Norici, who in older times had borne the name of Taurisci.† But a people does not change its name unless it is conquered or absorbed by another nation; the Celtic Norici had doubtless subdued the older Taurisci, who, lying next to the “Tyraseti,” and on spurs of the same mountain-chain, had once been Tyrasici. Just south of them lie the Japodes, inhabiting, as Strabo tells us, the Mons Albius, “which is the end of the Alps. Their weapons indeed are Celtic,” he writes, “but they tattoo their bodies like the other Illyrians and Thracians”‡—a custom noted among the Thracians by Herodotus, who says that among all their tribes but three which he has mentioned, to be tattooed is a sign of noble birth, and not to be tattooed of the reverse.§

Thus Strabo’s language indicates not only that the Japodes, the Illyrians, and the Thracians had an important custom in common, but that they were all parts of one nationality; and, in keeping with this, we find a town called Tauris in Dalmatian Illyricum, as we find also a Tauriana in the neighbouring state of Paeonia, and a Tauresium in Thrace itself. In Pannonia (or south-western Hungary) again, we find a Taurunium. Passing north-eastward, we next enter the land of the Agathyrsi, whose customs, as we have learnt, greatly resembled those of the Thracians, and who, along with the Thracian Getae, afterwards formed the chief population of the Roman province Dacia: the last two syllables of their name seem again to enwrap the venerable patronymic; and so do the first two of another Dacian tribe, the Teuristoi, dwelling in Ptolemy’s time (140 A.D.) near the sources of the Tyras.|| It must be borne in mind that for the knowledge of most of these names in *Taur*—and *Teur*—we are indebted to Greek geographers, and that the second vowel is the Greek *υ*, like the one vowel in the first syllable of Tyras: so the resemblance is greater than at first sight appears.¶

* Justin, XX, 5; Pliny, III, 24.
Pliny, III, 23. † Strab. VII, v, 4.
‡ Ptol., VIII, viii.

† Strabo., IV, vi, 9, VII, iii, 2;
§ Her. V, 6.
¶ But see p. 100 Final Notes

We have now completed the circuit back to Thrace, and have thus linked the settlements of the great family of Thiras as far west as Italy with its earlier seats in the Balkan Peninsula and its still earlier haunts in Asia Minor.

We can trace its previous migration a stage or two further back. About 220 miles due east of the Lydian Tyrrha, or say 210 miles by the high road, stood Tyriaeum in Lycaonia. And with this we may compare the fact that the Cabalians, who occupied a small state just east of Caria were Maeonians, and that in Xerxes' army they had the same equipment as the Cilicians. Does not this point to near relationship, indicating that at all events a portion of the people who dwelt in Cilicia (doubtless the mountaineer portion, for the Caballi were mountaineers) belonged to the Maeonian, or Tyrsenian, or Thirasian race? Again, why is the chain of the Taurus Mountains to have its name derived from the Aramean *Tur*, a high mountain? The Arameans proper never extended up to the range; and the Assyrians and Babylonians, who in turn did so for a couple of hundred years in all, only touched it for one-fourth of its length; while, long before they achieved any permanent conquest there, they must have in their correspondence with other nations have read and written the name of the range hundreds of times—an older name given to it by some nation that dwelt along its slopes. I submit that, as we have seen the *Tyr-* of *Tyras* change to *Taur-* in Europe, so did it in Asia; and that, since various tokens point to the original family of Tyras as having inhabited and moved along the Taurus in the earliest times, the range was called after the patriarch Tiras, when the other families of Japhet and Shem found him and the early generations of his descendants building their huts and grazing their flocks upon its slopes.

It is possible that a familiar figure in the Greek Heroic Age is that of Tiras or Thiras himself. According to different authors, the blind seer Teirēsias had the privilege granted him from heaven "to live either through seven or through nine generations; while he acted so prominent a part in the mythical history of Greece, that there is scarcely any event with which he is not connected."*

We will now pass beyond Italy, and see whether we can trace the progeny of Tiras in Western Europe. We have already pointed out an important Taurasia in Italian Liguria: in Gallic Liguria we have a place called by Pliny† Tarusco,

* Smith *Dict. Myth.* "Teirēsias"; cf. p. 30, *Titarēsios*. † III, v (iv).

but now Tarascon; on the Gallic slopes of the Pyrenees eastward a mediæval *Castrum Tarasco*, now also Tarascon; and in Aquitania, on the northern spurs of the Pyrenees, the tribe *Tarusates*.^{*} After this no relic of the patriarchal name is found with any certainty. The point in the westward migration was here so remote and must have taken so many ages to reach, that the forefathers' name, if forefather he was, at last dropped into oblivion; but the fact that it appears up to the end of the northern side of the Pyrenees, and disappears upon the south side, shows both that the first colonists of Spain crossed these mountains to enter that country, and that they crossed very slowly and gradually. It is true that the prefix *Tur-* occurs in the names of many tribes or places both north and south of the Pyrenees; but Isaac Taylor informs us that this is cut short from a Basque or Iberian word meaning *fountain*: and this brings us to the other plan of linking the nations together—the one so largely adopted in my former paper.

The Basques now occupy the south-west corner of France below the Adour, and the three small adjoining provinces of Spain called the Biscayan: they are the last remnant of the Iberi, who once occupied the whole of Spain and a much larger corner of France than now, known as Aquitania, and extending up to the Garumna. Long before the Roman conquest of Spain, however, the Kelts, or Gauls, had penetrated through their lines, probably after forcing them back from a still larger Aquitania, and had established a purely Keltic nation in the north-west of the peninsula known as the *Callaici* (now as the Galicians), and a nation of mingled blood in the centre—the *Celtiberi*. Now, to find out whether these Iberi had previously settled in any other part of Europe, let us take some of their commonest geographical prefixes and suffixes, and see if we can find them in other countries; and, above all, if we can thus identify the Iberi, or Basques, with the Ligurians and Etruscans, for then we shall have proved the progeny of Tiras to have reached and colonised Spain also.

Firstly, *asta* in Basque means *a rock*; and we have *Hasta* (now *Asta*) in Baetica, or southern Iberian Spain: *Hasta* in Etruria, and *Hasta*, or *Asta* (now *Asti*), in Italian Liguria; as we also have *Astacus* and its gulf in Bithynia, and *Astai*, a population in Thrace.

^{*} Compare also *Tarus* (now *Taro*), the name of a river in Italian Liguria, which runs past Parma into the *Padus* (*Po*).

Secondly, *-ura* in Basque means *water*: and we have Astura in Baetica (Spain), Astura in Latium (Italy), and Astyra twice in the Troad; as we have also Iluro in Tarraconensis (Spain), Iluro in Aquitania (South-west France), and Illyris, or more rarely Illyria (extended in Illyricum), a country on the east side of the Adriatic Sea; and, again, Uria, stated by Taylor to be a Basque town or village, Uria in Apulia and in Calabria (Italy); Hyria in Campania (Italy), and Lake Hyria in Ætolia (Greece); and, yet again, Urbiaca in Tarraconensis (Iberian Spain), also Urbina—Taylor; two towns called Urbinum, or Urvinum, in Umbria (Italy), and a Lake Urbino between Umbria and Etruria.

Thirdly, Iturissa in Basque means a fountain; and we have Tyrissa in Macedonia.

Fourthly, *Bi* is an Iberian, or Basque, prefix; and we have the Bituriges Vivisci in Aquitania Proper, the Bituriges Cubi in wider Aquitania, and Biturgia in Etruria.

Fifthly, *Ar-* is an Iberian, or Basque, prefix; and we have the Arevaci, a people in Spain, the Arvernus Mountains in greater Aquitania, the Arnus River in Etruria, Arpinum in Latium, Arpi in Apulia, and the rivers Arda and Ardiscus in Thrace Proper.

Ar- is also a common prefix in the heart of Western Asia, but not near to Thrace; and Thrace certainly did not get colonised from Armenia or Persia.

The same remark applies to *Si-*, which is an Iberian prefix, and which we find in:—

Sigarra in Tarraconensis (Iberian Spain);

Siculi or Sicani, the original name of the Sicilians;*

Sicyon, the most ancient city of Greece, situated in Northern Peloponnesus; and

Sigeum in the Troad.

Lastly, whereas *-ula* is an Iberian suffix, heard, for instance, in Ilipula, the name of three towns and a mountain in Baetica (Spain), we find it in the name of a mountain pass in the Grisons (Raetia)—the Albula Pass, and in Albula, the first name of the Tiber.†

* Also two rivers: Silarus in the northern and middle Apennines.

† Pliny, I, 30.

It will occur to some that this community of nomenclature is so widespread that the Thirasiens, Thracians, or Tyrsenoi must have once quite pervaded each of the three great peninsulas of Europe; and therefore that they must be identical with the Pelasgoi, who in a remote period peopled Greece and Southern Italy, and who, Herodotus says, still spoke a tongue quite differing from Greek where they were isolated from the Greeks; and, while Smith's *Dictionary of Classical Geography* builds up a careful argument to show that the Thracians and the Pelasgoi were one people, Professor Oscar Meuthelius contends that the names Pelasgoi and Tyrsenoi are freely interchanged by the early Greek writers. I am struck by the fact, however, that in the passage cited Herodotus, in one of his examples, uses the words: "Those Pelasgoi, for instance, who live at Creston above the Tyrsenoi," showing that he did not deem the Pelasgoi to be identical with the Tyrsenoi.

I must now revert to the passage quoted in my former paper from Tacitus's *Agricola* respecting the natives of South Wales and Cornwall in his days. "The dark faces of the Silures and their usually curly locks, coupled with the fact that Spain lies over against them, creates a belief that ancient Iberians crossed over and took possession of this region as a settlement."* It is the belief of Professor Rhys, the philologist, that such an admixture is what has caused the divergence of Welsh from other Keltic languages in the United Kingdom, and Mons. George Lecoat (or Arcoat), a Breton pastor and antiquary, assures me that the shorter built and broad-faced men with black eyes, who are descended from the Britons who escaped to Armorica after the Anglo-Saxon invasion, occupy a distinct habitat from the slender, long-faced men with brown eyes who are descended from the old Veneti and Armoricans,† and that the former are still called by the rest Breiz, or tattooed ones,‡ though they have made tattooing very popular in Brittany§ ever since their arrival ages ago.

Yet it was not necessary for the Silures to sail all the way from Spain; since from Aquitania (which our comparison of geographical names has shown to have been far larger than in Cæsar's day, extending on one side probably up to the

* *Agricola*, XL.

† The two types were set forth by a number of photographs taken for the purpose by the late Gen. Pitt Rivers.

‡ The generally-received derivation of *Picti* (Picts).

§ Cf. what is said about the Thracians on pp. 89, 90.

mouth of the Loire) they might have sailed through a calmer and narrower sea to Britannia.

That they bestowed on our island that name Isaac Taylor is positive, from the many analogies that he finds in Spain where *-tani* is the commonest ending for the name of a nation or *-tania* for its country.* If so, it is a justification for my having pursued so far in your hearing the wanderings of Thiras. One thing is certain, *Silures* has a doubly Iberian ring—at its beginning and its ending. But the Scilly Islands were called by the Latins *Silurum Insulae*. Was not the *c* there then, or, if not, where did it spring from? My own impression is that the full name was *Siculurum Insulae*; and, if so, it would make the proof still stronger that the children of Thiras planted settlements all down the Italian peninsula; for, according to early traditions, the dominion of the Siculi had once extended far up into Latium, where they built Tibur, or Tivoli, long before Rome was born.

There is more truth than at first appears in the myth that Taras, a son of Poseidon, the sea-god, rode from Greece to Italy on a dolphin and there founded the city of Tarentum, where he was worshipped as a hero.

There may, too, be something to find out and to tell about an *eastward* migration of part of the great family of Japhet's youngest son. Truly in his case is the prophecy fulfilled, "God shall enlarge Japhet."

FINAL NOTES.

That the divers geographical and national names which we have derived from *Thiras* may reasonably be derived from that name by phonetic changes commonly occurring in other words is proved by the following examples:—

1. The sound *ɣ* passes into the Swedish *ȝ*, or German *ü* (= *ɣ* before French *u*) in the respective series—Greek *mintha* [Latin *mentha* or *menta*], Anglo-Saxon *mint*, English *mint*. German *münze*, Swedish *mynta*; Maeso-Gothic *ginnan*, Old High German *biginnan*, Ger. and Dutch *beginnen*, E. *begin*, Sw. *begynna*; and A.-S. *wringan* (to press, strain), Du. *wringen* (*id.*), Low Ger. *wringen* (to twist together), O.H.G. *hringan* (to wring, to wrestle), Ger *ringen* (to wrestle), whence Mid. Eng. *wrinkel*, Old Du. *wrinckel*, Sw. *rynka*.

* Carpetania, Lusitania, Turdetania and the like—*Names and Places*, p. 39.

2. Swedish *ȳ* passes into *eu* (first = *ē* + French *u*, as often among the Swiss now, afterwards = our *oi*) in the—A.-S. *fȳr*, Dan. and Sw. *fyr* [Eng. *fire*], Ger. *feuer*; A.-S. *hȳr*, Dan. *hyre*, Sw. *hyra* [Eng. *hire*], Ger. (obsolete) *heuer*; and Ice. *býti* (barter), Dan. *bytte* (barter, booty), Sw. *byte* (barter, share, booty), Ger. *beute* (booty).
3. Anglo-Saxon *ȳ* and Swedish *ū* (= French *ū* + *ŭ*) are interchanged with *au* in—A.-S. *hȳd*, Dan. and Sw. *hūd*, O.H.G. *hūt*, Ger. *haut*: and Icelandic *skrufa*, [E. *screw*], Sw. *skruf*, Ger. *schraube*.

The first syllable of Titaresios (see p. 90) is heard in the names of three noted rivers in the larger Etruria—namely, the Ticinus, Tifernus, and Tiber—of the Tibiscus in Dacia, the Tilurius in Dalmatia, and the Timacus in Moesia. In Sardinia we have the Thyrsi, reminding us of the Agathyrsi.

On the motion of the Chairman, seconded by Lieut.-Colonel Alves, the thanks of the Meeting were unanimously accorded to the author for his learned contribution to the history of the nations of antiquity, and regret was expressed that time did not admit of discussion.

ORDINARY GENERAL MEETING.*

CAPTAIN G. P. HEATH, R.N. (RET.), IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed.

ELECTION.—Mrs. A. E. von Braun was elected a Member.

The following paper was then read by the Author :—

THE HISTORY OF THE SPREAD OF THE EUROPEAN FAUNA. By Professor J. LOGAN LOBLEY, F.G.S., F.R.G.S.

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INTRODUCTION.

IT is impossible to adequately present the complex subject of the history of the spread of the European Fauna in a single paper. All that can be attempted is such a general conspectus as may serve to show the interest and importance of the enquiry, as well in itself as in the assistance it gives towards the solution of geographical and geological problems.

Although this subject received the attention of that great teacher of geology, Sir Charles Lyell, and was presented more fully by Professor Edward Forbes in 1846, followed by the biological and geographical work of Dr. Schläger and Dr. Russell Wallace, it is only lately that it has become prominent, and this largely due to the researches of German, Russian and

* Monday, February 18th, 1907.

French savants, and the writings and lectures of Dr. Scharff, of Dublin, who has gained for it wide recognition.*

The word *fauna* is used in science to include not only all forms of living animal organisms, the lowest as well as the highest, but also all animal organisms that have lived in past geological epochs, Palæozoic as well as Neozoic. But in this paper reference will necessarily be omitted to the lowest invertebrates, and to Man, the highest vertebrate, as well as to the vast number of species that have ceased to inhabit this part of the earth's surface before the Quaternary epoch.

In approaching the question of whence and by what routes came the animals of Europe, it is in the first place necessary to know their present habitats and dispersal, by which knowledge may be obtained some indication of the direction of their original homes. It is also requisite to know the proportion of species in many localities, that the region inhabited by the maximum number may be determined. Consideration must likewise be given to the causes that produce, facilitate, retard or hinder migration, both biologically and geographically.

The enquiry into geographical and climatal conditions, as well as of configuration both of land and sea, and of surface elevations and depressions, opens up the great question of the changes of land and sea areas, and of great alterations of temperature which have taken place in recent geological times; but for our particular and limited enquiry, the changes that have taken place in the Eurasian area, or, more precisely, in the Palearctic region of Dr. Sclater will be sufficient.

These geographical changes having been produced by geological causes, and followed by geological results, can only be known by the study of the geology of the region affected, and the conclusions derived therefrom. This, of course, affords scope for much disputation as to details, but the general conclusions may be said to be well established.

The importance of geographical changes in determining the course of a migration of animals is obvious, since wide sea areas render impossible the passage of all vertebrates except birds, and of all invertebrates except some insects. The change therefore of a land area into a sea area, or of a sea area into a land area, will have most important distributional consequences. The elevation of land, too, is a powerful influence, since it is followed by a lowering of temperature, and if the elevation is great,

* A review by the Secretary of Dr. Scharff's lectures, in book form, will appear in the succeeding volume of *Transactions*, No. XL.

producing mountain ranges, a formidable obstacle is raised against animal migration. So also a wide area of waterless or desert land will present a difficulty effectually preventing the further travel of many species, and impeding the progress of many others. Even a river may bound the habitats of species. Dr. Russell Wallace found that in the Upper Amazon Valley* "several species of monkeys, birds and insects come up to the south bank of the river, but do not pass it, while allied species come to the north bank, which in like manner forms their boundary."

Again, there is the phenomenon of discontinuous areas of distribution in which the same genus or even species may occur, although the areas may be at great distances apart, without appearing in the intermediate areas. Of these Dr. Wallace says:—"The known and probable changes of sea and land, the known changes of climate, and the actual powers of dispersal of the different groups of animals, were such as would have enabled all the now disconnected groups to have once formed parts of a continuous series."†

Thus a wide field of enquiry is opened, and for complete results a very large amount of investigation and research will be required. The results here given must therefore only be regarded as partial, approximate, and very incomplete.

GEOGRAPHICAL CHANGES.

Since the fauna of Europe has been ruled and regulated, advanced and retarded, by geographical changes, a brief sketch may be here given of these changes of land and sea in the Palæarctic region during recent geological times, so far as they appear to be indicated by geological and biological considerations.

This part of our subject has received considerable illumination from the work of Professor Hull, who, in papers to this Institute and elsewhere, has shown from soundings off the European coasts the former extension westwards of our continent. By this extension the south-west of Europe, or what is now Spain and Portugal, was united to England and Ireland, giving direct land communication with the south-west of our sister island, or what is now the County Kerry. The land area would then be so continuous that the British Islands would be part of the Continental area, and where is now

* *Island Life*, chap. ii, p. 18.

† *Ibid.*, chap. iv, p. 70.

the North Sea, the English Channel and the Irish Sea, would all be land areas with the exception of a long lake between Ireland and the Isle of Man, giving a river flowing to the south between Ireland and Cornwall.

It is also concluded that much of Central and Southern Europe was covered by a sea in which the Miocene beds of those areas were deposited and above which the present Alpine mountainous region displayed itself only by some low hills.

The Mediterranean Sea would then be two or three inland seas or lakes, with Greece united to Syria, Sicily united to Africa, and Sardinia and Corsica to France. No Straits of Gibraltar would have existed, for the South of Spain would have been joined to the North of Africa by a land area that would include the Balearic Islands, but it would be cut off from Europe by a sea or straits occupying the present valley of the Guadalquivir, and the North of Africa would have been separated from equatorial Africa by the Sahara Sea, which there is evidence for concluding continued until recent times.

In the east, the Aralo-Caspian area has been occupied by a great sea which there is reason to believe extended northwards to the Arctic Ocean; while the Baltic marine area would extend to the White Sea on the north-east and cover the lower lands of the Scandinavian peninsula to the west.

Far to the north, and curving westwards round the northern end of the Western Ocean, there would have been a land area joining the then narrow but lofty Scandinavian land by way of Spitzbergen to Greenland and the American continent. At the same time, probably all Northern Europe, from Denmark eastwards, would have been under water.

But after the Miocene period, the central and southern parts of Europe were elevated, and continued to rise until the previous low hills in a watery plain gradually became an extensive hilly region; and then a great series of mountain ranges on elevated land forming the Pyrenean, Alpine and Balkan region, which is now the distinguishing feature of Central Europe. A land communication was thus established between France, Germany and Asia, south of the Caspian Sea.

The North-Eastern Sea appears to have advanced westwards and southwards as far as the eastern parts of England, and the Great Western Sea we call the Atlantic, advanced eastwards to the present shores of Portugal, Spain and France, with an incursion between Ireland and Cornwall along the direction of the Bristol Channel, and another between England and France along the direction of the English Channel.

Still later, it is contended, this sea advanced sufficiently westwards to cover the East and the North of England, the South of Scotland and a large part of Eastern and Central Ireland, while the West and North of Ireland remained connected with North Scotland and its islands on the west and north by continuous land. Subsequently a general elevation of Northern Europe laid bare an immense area of sea-bottom which established land communication between Western Europe and Asia, north of the Caspian Sea, and gave the configuration of land and water very much as it is at present, completed by the cutting through of the Straits of Dover and the Straits of Gibraltar.

AUTOCHTHONOUS SPECIES.

By far the greater number of the animals at present or recently living in Europe, and those now extinct but which lived in the European area during the Pleistocene or Pre-historic Quaternary period, have had for their original homes areas outside European boundaries. But there are a certain number of species which appear to have originated within the area of the European continental platform.

These autochthonous animals, as they have been called, appear to have spread in various directions from certain limited regions, or, it may be said, centres, which have been determined by the present extension and distribution of these species.

Three European areas of dispersion of autochthonous animals seem to have existed. The earliest has been called the Lusitanian region of dispersal, although it is much more extensive than Lusitania or Portugal, since it comprehends the whole of the present Iberian peninsula with the north-west of Africa, and an area that extended westwards into the Atlantic. Another was a south-eastern region, comprising the Balkan peninsula, and a third was the central mountainous area of the Alps and its extensions.

The most important of these was undoubtedly the south-western or Lusitanian region, from which area species migrated northwards, north-eastwards and eastwards. The northward migration was favoured by the Atlantean extension of the continent which gave a direct land communication westwards of the Bay of Biscay for Lusitanian species to reach the South-West of England and Ireland. And thus it is that these areas contain both plants and animals not found in other parts of the British Islands or on the continent of Europe except in the south-west.

Perhaps the most notable animal of these species is the Gasteropod *Geomalacus maculosus* or spotted slug, which is in Kerry and Portugal.* The former direct land connection between Portugal and Ireland is also evidenced by the *Arbutus unedo*, or strawberry tree, and the *Euphorbia hiberna*, or Irish spurge, both species of South-West Europe; but in the north confined, the former to South-West Ireland, and the latter to that area and South-West England.

The mammals of Europe that may be regarded as having a Lusitanian origin are the rabbit (*Lepus cuniculus*), which is in Spain, France and the British Islands, and is fossil in the Pleistocene of Germany, and two moles of the genera *Myogale* and *Talpa*.

Of birds, there is one that is known in the British Islands, but only in the South-East of England, the Dartford warbler (*Melizophilus undatus*), that ranges to the extreme South-West of Europe, and another species of the same genus is in the Mediterranean Islands, and both may be regarded as of Lusitanian origin. Other Lusitanian birds are the pied wagtail, the bearded titmouse and some species of magpie and finch.

Of Reptilia may be noted the snake (*Tropidonotus viperinus*), and two or three species of lizards; while of Amphibia there are several toads, three newts, and the *Salamandra chiloglossa*. There are, too, a number of species of terrestrial Mollusca, both of *Helix* and of slugs, including the before-mentioned *Geomalacus*. No less than ten species of spiders, several butterflies and beetles, and some other small invertebrates, are regarded as being of Lusitanian origin.

The south-east of Europe with its Balkan highlands was a considerable centre of dispersal of land Mollusca. One genus, *Clausilia*, has but a few species in the British Islands, and there is only one *Clausilia* in Spain, while in the south-eastern region there are about one hundred and thirty species.

Although probably the Alpine central region gave to Europe no new genus of Mammalia, there are several species that appear to have been there developed from more ancient stocks.

Of these the most noteworthy are perhaps the chamois (*Rupicapra tragus*) and the steinbock (*Capra ibex*). Both of these characteristic Alpine animals are doubtless species of genera of Asiatic origin which have been subjected to mountain conditions, and so have given the present Alpine forms. So also may be regarded the Alpine marmot (*Arctomys marmotta*),

* For a figure of this animal, see Scharff, *European Animals*, p. 89.

the vole, *Evotomys nageri*, the Alpine shrew (*Sorex alpinus*), and the little dormouse (*Muscardinus avellanarius*), although the last named has spread over a large part of Europe, but not to Ireland.

This, however, can scarcely be said with respect to the genus *Salamandra*, which appears to be of Alpine origin, for although two species, *S. maculosa* and *S. caucasia*, have a somewhat extended range of habitat, it is centred on the Alpine region, while the third species, *S. atra*, is never found on the lower lands.

Species of land Mollusca of the genera *Helix*, *Pomatias*, *Zonites*, *Acme*, and *Dandibardia* appear to have had an Alpine origin, with some butterflies and grasshoppers.

SOUTH-EASTERN IMMIGRANTS.

The immigration of animals into the European area from Southern and Western Asia was by far the most important contribution to the fauna of Europe.

Europe itself, as has been stated, does not seem to have produced any genus of Mammalia, and the few that have entered Europe from Arctic lands are small and unimportant, though possessing considerable interest for the purposes of this enquiry; while the later immigration from North-Eastern Asia, or Siberia, important as it was undoubtedly, was much less considerable than the migration westwards into our continent of Southern Asiatic animals; for this much earlier faunal movement brought to Europe large quadrupeds and many birds and reptiles.

It was more especially an invasion of Miocene and Pliocene times; but the immigration has continued through the Pleistocene period down to historical times. Many of these Oriental immigrants have become extinct in the European area, but their bones are so abundant and well preserved in Pliocene and Pleistocene deposits that there is no difficulty in giving approximately complete lists of these animals, some of them well known as now living only in Asia and Africa.

The genus *Elephas* was represented in Europe by four species, while now there are only two species of elephants existing, the *E. indicus* of Asia and the *E. africanus* of Africa. Three of the four species ranged far north-westwards, and with land continuity found such a congenial habitat in what is now Britain that their bones are abundant in English Pleistocene deposits. In this district, the Thames Valley, two species were

so abundant that the teeth of no less than 100 elephants have been taken from the brick-earth of one brickfield at Ilford, Essex. It may also be noted here as interesting to London residents, that the bones of elephants have been found in many places in London itself, notably under Regent Street and Euston Square.

In the same Pleistocene beds are bones of rhinoceros and lion, and, more remarkable still, hippopotamus, which animal is now restricted to tropical African rivers. The excavation of the railway cutting at Kew Bridge revealed the bones of the following eight species of large mammals, all of Asiatic origin: *Bison priscus*, *Bos longifrons*, *Cervus elaphus*, *Cervus tarandus*, *Elephas primigenius*, *Felis spelæa*, *Hippopotamus major* and *Rhinoceros tichorhinus*.

In the deposits forming the floors of caverns, again, there are also the bones of the sabre-toothed tiger, *Machærodus latidens*, bear and, more numerous, hyæna.

The Pikermi deposits of Greece, which have recently been examined, give a remarkable assemblage of bones of animals, most probably of Asiatic and East African origin, amongst which are found the giraffe and antelopes and several species of monkeys.

Though the camel is not generally known as a living European animal, it still exists in one small area in South-West Spain, though probably introduced by man, but the fossil remains of the genus *Camelus* have been found in Roumania and South Russia. Similarly we find in one corner of the Spanish peninsula, Gibraltar, the so-called Barbary ape (*Macacus innus*).

That splendid animal, the Irish elk (*Megaceros hibernica*), which has left its bones and magnificent antlers under the Irish bogs as well as in the Isle of Man, England, Scotland, France, Denmark, Germany, Austria, Italy, and Russia, was probably specifically, as it undoubtedly was generically, Asiatic, though the species may possibly have been developed in Europe.

Of the more commonly known mammalia of Europe which have had a southern or western Asiatic origin may be noted the following: The badger, cat, common hare, fallow deer, goat, horse, pig, red deer, roebuck, and the sheep.

Many of our birds, too, have had a southern Asiatic origin especially those having a more resplendent plumage.

The peacock (*Pavo cristatus*), well known in Judea in Solomon's time, was in Greece after Alexander's Asiatic exploits

This typically Asiatic bird is now largely domesticated, but it is in a semi-wild state still in the South of Spain, where I have seen large numbers together.

The pheasant (*Phasianus colchicus*) another typical Asiatic bird, traditionally said to have been brought from the banks of the River Phasis by the Argonauts, extended its range to England certainly before 1199, for in that year King John mentions it in a licence or charter referring to Devonshire. Unlike the peacock, the genus *Phasianus* has many species and a very wide range in the Palearctic region.

The common barn-door fowl, as it is called, (*Gallus domesticus*) which is such a friend in giving to us our breakfast eggs, has many strongly marked varieties, but all are from the *Gallus ferrugineus* or *G. bankiva* of India. The genus has been in Europe from at least the times of the ancient Greeks, and was probably introduced into Britain by the Romans. Like domestic fowls, pigeons are very various, and, also like the former, the many varieties of domesticated pigeons are from one species, *Columba livia*, or rock pigeon. The genus *Columba* is widely dispersed throughout Europe, Asia and Africa, and is evidently of Asiatic origin.

Of smaller birds of Oriental origin, the nightingale (*Daulias luscinia*) is perhaps the most noteworthy. This evening songster and spring visitor to our shores has never been known in either Ireland or Scotland, and even in England its range is limited to the Southern and Midland Counties. Other Eastern birds are the bullfinch (*Pyrrhula vulgaris*), goldfinch (*Carduelis elegans*), dippers (*Cinclus*), fire-crested wren (*Regulus ignicapillus*) and the wagtail (*Motacilla*).

Another curious survival in Spain is that of the flamingo (*Phoenicopterus ruber*), which may be seen in flocks in the great marsh district, Las Marismas, near Seville.

Nearly all European Reptilia and Amphibia are South-Eastern immigrants. The lizards, which are so abundant in South Europe, and the snakes, which have travelled north as far as 72° N. Lat. in Norway, as well as toads and frogs, including the curious tree frog (*Hyla arborea*) of the Mediterranean Islands and the most southern part of continental Europe, and the still more curious chameleon (*Chameleo vulgaris*), are almost all of Oriental origin.

Of the terrestrial Mollusca, but few can be said to be of Asiatic origin, most of the species seeming to be indigenous to Europe. But of insects there are many butterflies, of which there are 20,000 species in the Old and New Worlds, many dragonflies,

and many beetles, of which there are altogether no less than 100,000 species.

The two remarkable species of Orthoptera (*Mantis religiosa*), the Praying Insect, and the Stick Insect (*Bacillus*) must be added. There are also a few spiders and a notable crustacean, the fresh-water crab (*Thelphusa fluviatilis*), which in Europe is quite confined to the south.

ARCTIC IMMIGRANTS.

Although in the early Glacial period much of Northern Europe was submerged below the Glacial sea, yet there seems to have been continuous land extending from the Arctic regions southwards by the Scandinavian highlands to Scotland and England, and so to Central Continental Europe, for the Straits of Dover were not then cut through. By this long and narrow land communication, animals might travel southwards as the rigors of the Glacial period increased in the more northerly lands. At the same time, with the extension of the Arctic land westwards to Greenland and North America, species inhabiting those remote Northern lands could find a way to Europe.

Thus can be accounted for the existence in the British Islands of animals from both Arctic and North American habitats. Some of these doubtless migrated from North America to Greenland and the Faroe Islands in still earlier times, probably later Tertiary, and then afterwards proceeded southwards when glacial conditions impelled a further migration.

Arctic conditions may include a great variation of temperature, one period being much more tolerable for animal life than another. Of this there are abundant evidences not only in the Arctic remains of animals, but much more in the Arctic fossil plants. But however much temperature may have changed, the shortness of winter days and lengthened nights, with short summers without darkness, have been constant accompaniments of Polar regions, and so climatal influences have always played a great part in determining the fauna of far Northern lands. The remarkable prevalence of white as the winter colour of both mammals and birds of Arctic lands is a conspicuous testimony to the powerful effects of the conditions of high latitudes.

As has been pointed out by Dr. Scharff, the large number of Lepidoptera, 243 species, found by Möschler to be common to both North America and Europe, and that twelve species while common to Nearctic and Palaearctic lands are absent from

Asia, is indicative of a former land connection between Northern Europe and Greenland. The evidence afforded by the flora of the Arctic regions of the Old and New Worlds also points in the same direction, and this is all supported by the configuration of the sea-bottom between Norway, Franz-Joseph land, Iceland and Greenland.

One of the most interesting results of the Arctic migration southwards was the presence of reindeer (*Rangifer tarandus*) in Europe as far south as the Pyrenees, and, too, in very large numbers, as is shown by their remains in the South of France. The cave deposits of the department Dordogne contain abundant bones of reindeer of the same type as those now living in the Barren Grounds of North America, which are smaller and have more rounded antlers than the Siberian type. This reindeer, called in America, Caribou, has left its bones in many places in the Pleistocene deposits of the British Islands, including Ireland, and it remained as a living species in Caithness, the most northerly county of Scotland, until the thirteenth century. As additional evidence of now vanished Arctic lands, reindeer are in the islands of Spitzbergen and Novaya Zemlya.

The arctic fox (*Canis lagopus*) is now confined to the mountains of Norway, but its bones attest its former presence in Britain and other European localities. The arctic hare (*Lepus variabilis*) is still in the British Islands, but confined to Ireland and Scotland, though it ranges on the continent of Europe into Scandinavia and Russia in the north, and in the south to the Alps, Pyrenees and the Caucasian mountains. This hare is white in the Arctic regions both summer and winter, in Scandinavia it is white in winter and brown in summer, while in Ireland it is brown all through the year.

Other Arctic immigrants to Europe are the stoat (*Mustela erminea*), which gives the much valued ermine, and the lemmings, two species of which are fossil in the Pleistocene of this country. The whale and the seal must also be added to the Arctic mammals of Europe.

Of Arctic birds we had in the extreme north of the British Islands until the beginning of the last century the remarkable species called the Great Auk (*Alca impennis*) which was very similar to the penguin now so abundant in the Antarctic regions. The well known Scotch, or red grouse (*Lagopus scoticus*) is an Arctic immigrant, as are also the willow grouse of Norway and the ptarmigan.

As both reptiles and amphibians are unknown in the Arctic regions, we cannot ascribe any European species of these classes

to Arctic migration, but of fishes Dr. Scharff regards the salmon family, the sticklebacks, the perches, many of the cod family, the herrings, and several flat-fish as of Arctic origin.

THE NORTH-EASTERN IMMIGRANTS.

The last great faunal invasion of the European area followed the retreat of the early Glacial sea and the establishment of land conditions extending from the east of Asia to the west of Europe northwards of the Caspian Sea. This has been called the Siberian migration, but as a large portion of Western Siberia had been under water, and the animals were from the more eastern area of central and northern Asia, I prefer to designate them the North-Eastern immigrants.

Impelled probably by search for food, the newly established land communication determined the route of the migrants along a zone due west to Central and Western Europe from the north of the Caspian Sea, to the south of which lay the route of the previous great migration of Asiatic animals which I have called the South-Eastern Immigration. The route of the second Asiatic immigration is very clearly indicated not only by the identity of living species in Eastern, Central and Western Europe with Northern, Central and Eastern Asiatic species, and their absence from the more northern and the more southern parts of our continent, but also by the fossil remains in the Post-Glacial deposits of a long and broad zone stretching westwards from Siberia across Europe midway between north and south.

Some of the immigrants prolonged their journey until they reached as far westwards as what is now England, demonstrating the land connection of this country with the continent then existing, and the more recent cutting through of the Straits of Dover. But these species are not, with one or two exceptions found in Ireland, demonstrating also that although England was joined to continental land, Ireland was then, as now, separated by a sea which prevented the further migration of these eastern animals.

Thus it is found that the very interesting difference between the fauna of Great Britain and that of Ireland produced by earlier migrations was increased and intensified by this later immigration of Northern Asiatic species. By these considerations we have an explanation of the absence from Ireland of many British animals, amongst which may be named the beaver, the dormouse, the common hare, the mole (*Talpa europæa*), the shrew (*Sorex vulgaris*), all lizards, all snakes, all

toads except the natterjack, all frogs except one species, the nightingale, the Roman snail (*Helix pomatia*) and *Cyclostoma elegans*.

Furthermore, it appears that the area of the settlement of the North-Eastern Immigrants was bounded south-westwards by the River Garonne, which does not seem to have been crossed by them, while the far northern lands of Scandinavia and Russia were also unvisited by these Asiatic animals, so that their area of occupation is well defined.

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To this immigration we also owe our thrushes, bullfinches and the nuthatch, and from it we have received the sand lizard and two other species of lizards, the viper and the frog, *Rana arvalis*. Of insects, the tiger beetle and several other beetles, and some European butterflies, may be ascribed to the North-Eastern Immigration.

As pointing to, if not proving, the former sea connection between the Arctic Ocean and the Aralo-Caspian region, it may be mentioned here that the *Phoca caspia* of the Caspian Sea is very like the seal of the Sea of Aral and the *Phoca baltica* of the Gulf of Finland, as well as the seals of the Arctic seas. There are also in the Caspian two species of *Mysis*, closely related to the *Mysis oculata* of the Arctic seas, as well as some other crustaceans of an Arctic character.

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The history of the spread of the European fauna suggests and opens many highly interesting questions on which much difference of opinion may legitimately arise, but the limits of this paper will not allow of my entering into these discussions. I must be content with having introduced the subject to the notice of the Victoria Institute, indicating its general scope, character and teachings, from which I think it will be seen that it at least offers a good example of the interdependence of different branches of natural knowledge.

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The SECRETARY, Professor HULL, F.R.S., after thanking the author for his paper, said,—There is an episode in the remarkable history of the European fauna, to which we have been listening, which I wish to advert to during this discussion. It has been only briefly alluded to by the author, because it is only indirectly connected with his subject; but from its unique character deserves special attention. I refer to the great migration of the European animals into Africa, towards the close of the Pliocene period—resulting in the re-peopling of that vast continent by new races of

animals and the expulsion of the aborigines. The subject has been ably developed by Dr. Alfred Wallace and Dr. Sclater, but newer light has been thrown upon it by observations on the relations of land and sea which brought about (as I believe) the Glacial Epoch.

The Pliocene period, as Professor LobleY has stated, was remarkable for great earth movements, causing elevation of the land and sea bed over the Europasian area, and consequent lowering of the climatic temperature. At the beginning of that period, Africa was isolated from Europe and Western Asia by a broad sheet of sea-water—but as time went on land arose at intervals all along the Mediterranean from the Atlantic westward—and *three causeways* were formed as lines of communications between Southern Europe and Western Asia, converting the Mediterranean into a succession of lakes—unquestionably fresh-water lakes.

Now we have heard how Europe and Asia were inhabited by animals largely representative of those of the present day—namely, huge pachyderms, ruminants, and ferocious felines, such as the lions, leopards and hyænas, which had migrated from the Asiatic region, but their range was bounded by the Atlantic and Mediterranean waters. We have now to enquire, what were the races of animals inhabiting the adjoining continent of Africa at the same period? We have learned from the researches of the authors referred to that the predominant forms were those of the semi-apes, known as the *Lemurs*, which have given the name to a region including Madagascar; but the pachyderms, the felidæ, the ruminants and other forms then flourishing in the Europasian continent were absent from “the dark continent.” However, the period and opportunity for a migration southwards into Africa gradually approached and was ultimately reached. Towards the close of the Pliocene period the three great causeways uniting the two continents above referred to arose from the ocean—one at Gibraltar Straits, the second between Sicily and Africa at Algiers, including Malta, and the third across the Isthmus of Suez. Impelled by the increasing cold of the approaching Post-pliocene or Glacial Epoch, those animals unable to endure the rigors of an Arctic climate instinctively bent their steps southwards; they crossed the causeways and entered the warm plains of Africa, driving before them the Lemurs and other humbler forms of animals, until they were exterminated or only found refuge in the Island of Madagascar—now separated by a deep gulf—but one

which owing to the rise of the land had become shallow, or perhaps obliterated.*

Such is, I believe, in brief the account of that great migration of Europasian animals into Africa, the progenitors of those now inhabiting that great continent; a migration of vast importance in the history of races, and recalling to our minds the successive migrations of the Asiatic tribes of men into Southern and Western Europe which are recorded in history, and of which we have heard so much from Mr. Rouse. It may not be considered inappropriate as an appendix to the able paper for which we have to thank Professor Lobley this evening.

MR. ROUSE.—Upon this instructive and fascinating paper allow me to make two criticisms.

Firstly, the rabbit is not now in Great Britain through having crossed from Portugal or Spain in prehistoric times. We read in Murray's *Historical English Dictionary*, "The rabbit is evidently of late introduction into Britain and Northern Europe; it has no native name in Celtic or Teutonic, and there is no mention of it in England before the Norman period." Its original name in English and its present day name in German, *cony* and *kaninchen*, are both derived, as that work tells us, from the Latin *cuniculus*, which in turn is, "according to ancient authors, of Spanish origin." The earliest quotation that Murray can find for the creature of this name is in 1200, the earliest for *rabbit* in 1440, where in an English-Latin word-list it is interpreted, "yonge conye, *cunicellus*"; while Turberville in his *Venerie* (lxiii, 178) writes, "The Conie beareth her Rabettes xxx dayes." Moreover there was no direct land connection in the Tertiary Æon between Great Britain and Lusitania, but only between our island and North-Western France; beyond that, around the Bay of Biscay, and down the coast of Galicia and Portugal, there was an extension of the land area about fifty miles out to sea, represented by the present sub-marine plateau; therefore any existing land animals that reached England from Lusitania overland

* Mr. Newton gives the fauna of Madagascar as consisting of 39 species of Lemuridæ, 25 of Chamelionidæ, 260 of birds, the Struthidæ (or great wingless birds) now in a fossil state, also three species of Hippopotamus, swine, and a slender-legged form of Zebu-ox (*Quart. Journ. Geol. Soc.*, Feb., 1895).

must have settled and bred in France on the way ; and, if none of their descendants are found in France, they could not have come overland, but must have been imported by ship ; as the snake and the slug and the insects referred to might readily have been in the innumerable cargoes of fruit and vegetables, that have in the course of ages sailed from Spain to Britain, and the moles may possibly have been also.

Secondly, there is a confusion in the paper between the migration of fauna in the historic age, or say during the last 4,000 years, and its extension in an earlier age which must have possessed different characteristics, since rhinoceroses, hippopotami and hyenas then abounded in countries where they now cannot live ; and since the relics of man associated with their remains show that the human race then possessed much greater strength than in historic times, and, as evidenced in the Old Man of Cromagnon, probably much greater longevity. I speak of course of the Palæolithic Age, which the late Sir William Dawson identified with the Antediluvian. In the later age it was needful that the land animals should all spread from Western Asia ; and it is most interesting to hear from the lecturer an account of this spreading. But in the earlier age there was no such necessity ; and we should naturally suppose that at their very creation they were dotted at various points over the earth's surface wherever there was the greatest sustenance for them.

The thanks of the meeting having been accorded to the author for his interesting and able paper the meeting separated.

ORDINARY GENERAL MEETING.*

COLONEL T. HOLBEIN HENDLEY, C.I.E., IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed.

ELECTION :—Colonel C. E. Yate, C.S.I., C.M.G., Late Chief Commissioner of Baluchistan, was elected Associate.

The following paper was then read by the author :—

ORISSA: A LITTLE KNOWN PROVINCE OF THE INDIAN EMPIRE. With some Personal Reminiscences.
By C. W. ODLING, C.S.I., M.Inst.C.E.

IT is unlikely that many of those present this afternoon have visited Orissa; indeed, it is chiefly owing to so little being known about this unfrequented part of the Indian Empire that I have ventured to submit to this Institute some observations on the country and its people. Orissa lies on the sea coast, south-west of Calcutta; it stretches from the Subunreka River on the north to the Ganjam district of the Madras Presidency on the south, a distance of more than 200 miles; its capital town, Cuttack, is 250 miles distant from Calcutta. Ships on their way from Madras or Ceylon to Calcutta generally sight either the Black Pagoda or False Point Lighthouse, both of which are situated on the Orissa coast. In my time, 1865–1875, the official Orissa consisted of the three British districts of Balasore, Cuttack and Pooree, and of nineteen feudatory states, the whole having an area of 24,000 square miles, and a population of 6,290,952, according to the census of 1901. In the recent partition of Bengal another British district, Sambalpur, and some more feudatory

* Monday, March 4th, 1907.

states have been added to Bengal, and the Orissa Commissioner-ship now contains practically the whole of the Uriya-speaking people, and is quite the size of Scotland.

The Uriya language, I may observe, is not a dialect of Bengali, but entirely distinct, having even a special alphabet of its own, said to be derived from Nagri, though it is only an expert who can trace any resemblance between them. My own introduction to the language was simple: six months after my arrival in India I was sent to a place called Patamundi, forty-four miles from Cuttack, to take charge of famine works, or, to put the matter more correctly, to find work for some 100,000 famine-stricken people. I had one clerk who knew English, and some few of my subordinates could speak Hindustani, of which language I had a very rudimentary knowledge, but the remainder of the officials and the people with whom I had to deal knew Uriya only. Within a radius of about thirty miles of my headquarters there were some twenty-five relief centres, where wages were disbursed and food sold; the accounts from these depôts were in Uriya, and these accounts it was absolutely necessary that I should read. Most things are possible at nineteen years of age, and it was not long before I was able to do what was necessary. I soon learnt the figures, entire words of common occurrence came next, and in a short time I was able to decipher the accounts and to check them. It may be of some interest to say, that though the money at the depôts was kept in not very large wooden boxes, and thousands of rupees were sent to me periodically from Cuttack in bags and distributed to the depôts, I never lost a rupee by theft; one misguided subordinate endeavoured to make away with some 150 rupees in his charge, but I fished it out of the bottom of the tank in which he had thrown it, and he did two years' rigorous imprisonment. To return to the Uriya language, I never advanced further than being able to read simple letters and accounts; I was obliged to pass an examination in Hindustani, and was content with the knowledge of Eastern languages which that test involved. The ancient records of Orissa were written on palm leaves with an iron pen, and though paper and a reed or quill pen are now mostly used, the practice of writing on palm leaves has by no means ceased. There is said to be no original composition of any merit in the Uriya language, but there are numerous translations of Hindu works.

The printing press was brought into use, in the year 1837, by the Baptist missionaries, who have been stationed in Cuttack since 1822. It is not too much to say that the

missionaries connected with this Society have done more than all the rest of the community, European and Indian, to produce and put in circulation books in the Uriya language. Up to the year 1822, when the missionaries first came to Cuttack, only some fifteen or sixteen Uriya books had been printed; these were produced at Calcutta or Serampore, and included the Bible in five volumes. Since 1837, numerous books, amongst them a complete Uriya-English and English-Uriya dictionary and many scholastic and religious works, have been published by the missionaries, and there have been other printing presses established since 1860. In 1904 there were 3,267 native Christians in Cuttack and Puri; I have not the figures for Balasore, the missionaries at which place belong to another (American) society. The native Christians are in all walks of life. When I was last in Cuttack one of them was a leading member of the local bar, and I am glad to say that they are not divorced from the land, there being several Christian villages, the inhabitants of which subsist by agriculture. The standard work on Orissa, from which later commentators have drawn much material, is a history of Orissa by Andrew Stirling, a Bengal civilian, to which an account of the Orissa Baptist Mission, by James Pegg, is appended; this book was published in 1846. To my mind, the most striking fact mentioned in the latter work is the heavy mortality amongst the earlier missionaries and their families—their children seem to have nearly all died before they were one year old, Mr. Pegg himself lost three children under that age; happily, things have improved, and when I was in Orissa there were several missionaries who had reached an advanced age. It is only right to add that the indirect influence of the missionaries and their power for good has been and is very great, and that, as educators and fearless critics of whatever they believe to be wrong, they are respected, and I may say liked, by the people generally.

The Sanskrit name of Orissa is *Utkala-desa*, the Glorious Country, and it is described by ancient Hindu writers as "the realm established by the gods, the land that takes away sin." "Of all the regions of the earth," said one of their sages, "India is the noblest, and of all the countries of India, Utkala bears the highest renown. Its fortunate inhabitants live secure of a reception into the world of spirits, and even those who visit it, and bathe in its sacred rivers, obtain remission of their sins, though they may weigh like mountains. Who shall estimate the soul's gain from a sojourn in such a land? But what need

toads except the natterjack, all frogs except one species, the nightingale, the Roman snail (*Helix pomatia*) and *Cyclostoma elegans*.

Furthermore, it appears that the area of the settlement of the North-Eastern Immigrants was bounded south-westwards by the River Garonne, which does not seem to have been crossed by them, while the far northern lands of Scandinavia and Russia were also unvisited by these Asiatic animals, so that their area of occupation is well defined.

To this immigration Europe is indebted for no less than twenty-eight mammals, of which nine are still, or were recently, living in the British Islands. These are the beaver, the harvest mouse, the pole cat, the common shrew, the stoat, the vole, the water vole, and another species, *Arvicola glareolus*, and the weasel. The remaining eighteen are either now living in parts of the European continent, or, as their bones attest, did so in Quaternary times. These are the Arctic fox, the glutton, the tailless hare, three species of hamster, the jerboa, two species of lemmings and three species of *Arvicola*, the Bobak marmot, and two species of pouched marmots, the moose deer and another species of *Alces*, the musk ox, the Saiga antelope and the Siberian reindeer.

To this immigration we also owe our thrushes, bullfinches and the nuthatch, and from it we have received the sand lizard and two other species of lizards, the viper and the frog, *Rana arvalis*. Of insects, the tiger beetle and several other beetles, and some European butterflies, may be ascribed to the North-Eastern Immigration.

As pointing to, if not proving, the former sea connection between the Arctic Ocean and the Aralo-Caspian region, it may be mentioned here that the *Phoca caspia* of the Caspian Sea is very like the seal of the Sea of Aral and the *Phoca baltica* of the Gulf of Finland, as well as the seals of the Arctic seas. There are also in the Caspian two species of *Mysis*, closely related to the *Mysis oculata* of the Arctic seas, as well as some other crustaceans of an Arctic character.

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To this immigration we also owe our thrushes, bullfinches and the nuthatch, and from it we have received the sand lizard and two other species of lizards, the viper and the frog, *Rana arvalis*. Of insects, the tiger beetle and several other beetles, and some European butterflies, may be ascribed to the North-Eastern Immigration.

As pointing to, if not proving, the former sea connection between the Arctic Ocean and the Aralo-Caspian region, it may be mentioned here that the *Phoca caspia* of the Caspian Sea is very like the seal of the Sea of Aral and the *Phoca baltica* of the Gulf of Finland, as well as the seals of the Arctic seas. There are also in the Caspian two species of *Mysis*, closely related to the *Mysis oculata* of the Arctic seas, as well as some other crustaceans of an Arctic character.

Some of the migrants from Siberia seem to have advanced westwards into Europe for a certain distance and then to have retreated towards their original homes. Such, for example, is the Saiga antelope, or *Saiga tartarica*, which is now only found in the East of Russia near to the Asiatic border.

The very interesting Cromer Forest Bed, abounding as it does with mammalian remains, has been the subject of considerable discussion as to its geological age. It is usually

regarded as Newer Pliocene, but Dr. Scharff thinks it ought to be considered as of Inter-Glacial age and therefore Quaternary, and that this may have been the period of this North-Eastern Immigration. He contends that comparatively mild climatal conditions may have existed during the Glacial epoch in the North of Europe, very near to the glaciated region, as is now the case in New Zealand and Switzerland where grapes ripen near to the foot of great glaciers, and that these mild conditions would allow of an abundant fauna living then in the southern part of the British Islands.

The history of the spread of the European fauna suggests and opens many highly interesting questions on which much difference of opinion may legitimately arise, but the limits of this paper will not allow of my entering into these discussions. I must be content with having introduced the subject to the notice of the Victoria Institute, indicating its general scope, character and teachings, from which I think it will be seen that it at least offers a good example of the interdependence of different branches of natural knowledge.

DISCUSSION.

The discussion was opened by Sir HENRY H. HOWORTH, F.R.S., who dwelt upon the evidence of the former connection between the Iberian peninsula and the west of Ireland, as shown by the presence of several plant forms, such as the *arbutus*, two species of heaths of which the "Mediterranean heath" is abundant in Galway, and the *Osmunda regalis*—a magnificent fern which grows luxuriantly both at Killarney and in Donegal.

The SECRETARY, Professor HULL, F.R.S., after thanking the author for his paper, said,—There is an episode in the remarkable history of the European fauna, to which we have been listening, which I wish to advert to during this discussion. It has been only briefly alluded to by the author, because it is only indirectly connected with his subject; but from its unique character deserves special attention. I refer to the great migration of the European animals into Africa, towards the close of the Pliocene period—resulting in the re-peopling of that vast continent by new races of

toads except the natterjack, all frogs except one species, the nightingale, the Roman snail (*Helix pomatia*) and *Cyclostoma elegans*.

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So much for the history of the country, Turning to its present condition, the province of Orissa consists both politically and geographically of two distinct tracts, the delta of rice-fields and swamps reaching from the mountains to the sea, and the hill country at the back, stretching into Central India. The hills range in height from 500 to 4,000 feet, above mean sea level, and are for the most part covered with forests, in which sal, a valuable tree that rises to 60 or 70 feet in height, and thorny bamboos predominate. Through these hills three great rivers make their way to the plains below, on entering which they divide and again intermingle in their path to the sea. The greatest of these rivers, the Mahanadi, is, during the rainy season, two miles in width at Cuttack, 160 miles further up, at Sambalpur, it is one mile wide, and in the Burmool Pass, between these towns, where it is narrowed by the hills, it has been known in flood time to rise 70 feet above its summer level. In the dry weather it is fordable in places with some little difficulty. The River Brahmini is about a mile wide where it enters the plains and the Byturni half a mile. Both these rivers are easily fordable in summer. Smaller, yet still considerable rivers, are the Subunreka, the Burabolong and the Salundi. In the south there is a large expanse of water known as the Chilka lake. The rich delta is under the direct administration of the British Government, whilst the hill country is governed by native chiefs, who, so far as their own subjects are concerned, settle all civil disputes and have a limited criminal jurisdiction. Sterling remarks that the hill states were exempted from the operation of the British laws, as a matter of convenience and not to any claim the rulers had to independent authority, but in the eighties, the question in some way or other came before the Privy Council, and that august authority ruled that they were not British territory at all, with the result that some Acts of the Indian Legislature which had been expressly extended to them were, in this respect, repealed. But the control remains and is possibly more effective when the orders passed by the Executive Government cannot be questioned in a court of law.

The inhabitants of the hill states are mainly the hill tribes of whom I have spoken, but there is a varying proportion of Hindus who occupy the best lands, fill the State offices, and gather together the few rupees that may be obtained. There is a more primitive system of government still in the Kandh mehals, once a part of the native state of Boad, but annexed by the British Government as the Rajah was unable to put a stop

to the human sacrifices which prevailed there. The Kandhs are one of the ancient peoples previously mentioned who, under pressure of the Hindu invasion, retreated to the hills and formed the peasant militia which repelled the Afghan invaders. Their only business is agriculture; war, which was their former occupation, being now forbidden. They retain the bow and arrow, the axe, a sword and a sling, but the old battles, which are said to have continued—the women and old men looking on—until one side was exterminated, have perforce ceased. They pay neither taxes nor land revenue, acknowledge no subordination to a local ruler, though the headman, in conjunction with the elders of the village, is an arbiter in the case of private wrongs, depending for obedience on his personal influence; in short, there is as near an approach to anarchy, in the sense of every man doing what is right in his own eyes, as is compatible with the stern repression of armed aggression. The British Agent supplies a real want as a centre of authority for the village communities, who otherwise recognise no common head: his duties are confined to stopping blood feuds, adjusting dangerous disputes, and taking cognizance of heinous crimes. The one difficulty with the Kandhs was the practice of human sacrifice. Their great ceremony was the worship of the earth god, and this involved shedding blood twice a year. The victim was provided by a special servile caste who kidnapped or purchased their prey. So far as the Kandhs were concerned it was essential that the victim should be bought. The cry as the first blood of the victim fell to the ground was "We bought you with a price, no sin rests on us." The practice was stopped by Lieutenant Macpherson, who gained the goodwill of the priesthood and village headmen partly by recognising their position and partly by grants of land.

The hill states governed by the feudatory chiefs are mainly inhabited by wild tribes under various names, some of whom are sufficiently civilised to have settled habitations round which there is cultivation, others clear the jungle, burn the trees, take two or three crops from the virgin soil, and then move on. Some live by collecting forest produce, which they exchange for grain. The clothing of these people is frequently rudimentary; most of them have so far advanced in civilisation as to wear woven clothes, but when I first went to Orissa in 1866, leaves formed the apparel of the wilder of the aboriginal tribes. During the minority of the Raja a friend of mine was in charge of the state of Keonjhar; with much trouble he came to an arrangement with the men of one of the wild tribes of that

state that if the women were provided, free of cost, with an outfit of clothes, those clothes as they wore out should be replaced, and leaves as a mode of dress abandoned. The first arraying of these ladies in strange garments was made the occasion of a state function. The women were paraded before my friend in their clothing of leaves and received their new raiments in his presence. They then retired to the jungle, clothed themselves in their novel dresses, and again passed before him in single line. As they came by their noses were smeared with red paint, and they were received into Hindu and civilised society. The men are armed with bows and arrows and matchlocks which, on more than one occasion, they have used with great pertinacity against the native soldiers of the Indian Army. They are at times a good deal harassed by the Hindu officials and traders, but there is a well-understood line which, if passed, is sure to lead to armed resistance. In 1869 I was living on the borders of one of these states when a small rising occurred, and from the account given to me some time afterwards by the brother of the Prime Minister, if I may so call him, I formed a very distinct opinion that my informant's brother, who was killed, had brought his fate on himself. At the same time I am bound to say that the general opinion is that the inhabitants of the native states are quite as well off as their brethren in British territory; there are occasionally cases of real and severe oppression, but the taxation is less rigid and if oppressive, it is both resented and evaded; the jungle is near and it is very easy to be "not at home" when the tax-gatherer calls.

Wild beasts exist in plenty. There are tigers, leopards, deer of several kinds, wolves, hyenas, an occasional bison and herds of elephants. I had the chance of witnessing an elephant catch conducted by my friend who ruled the Keonjhar State. For some reason or other, it was difficult for me to leave my post, and it remains one of my lost opportunities. The elephants were enticed into an enclosure by decoys—trained female elephants—then secured to trees, and a month after my friend appeared at my headquarters, which was fifty miles distant from the Keddah, with his catch of twenty-five elephants. I may here say that, with the exception of the elephant, the bison and some of the varieties of deer, the animals mentioned exist in less abundance on the plains. There are, besides, antelopes and buffalo; the latter has, however, I am informed, nearly disappeared. In the early days of the seventies they were numerous, as the sea coast was approached, and my own experience of big game

shooting has been mostly with them. They may be dangerous, especially solitary animals, who have probably been turned out of the herd on account of their fighting propensities. Alligators (both *muggurs* and *garials*) are plentiful. The winged game consists of partridges, jungle fowl, pea fowl, quail, snipe and wild ducks and geese. It is possible to get a good deal of excellent shooting in Orissa if sufficient time can be devoted to it, which with officials is rarely the case. One of my difficulties was early rising: when I appeared between four and five in the morning, my huntsman was wont to be very indignant at my not coming in the *early* morning.

We now come to the plains stretching from the foot of the hills to the sea, which are under direct British control. It was necessary to obtain from this part of the country a revenue sufficient to defray the cost of its administration. In 1870, as the result of elaborate inquiries, it was found that the family of a well-to-do agriculturist consumed food to the value of twelve shillings monthly, and that all their other expenses, clothes included, would be covered by another three shillings. The price of food in 1803 was from one-half to one-third of what it was in 1870, so that it was from a people, whose average expenditure was less than two shillings a head a month, that the cost of governing and protecting the country had to be found.

The main source of revenue was from the land of which the State was the owner, subject to the right of the cultivator to remain in possession on payment of a fair rent. In Akbar's time the land had been regularly surveyed, and each cultivator's rent fixed. This rent was collected by officials who were paid by commission, and who under English rule became *zemindars* (quasi landholders), with the right to collect the officially fixed rent from the occupiers, and the further right to settle tenants on unoccupied lands on their own terms. It was not until 1837 that a satisfactory settlement was made. The variation in the price of silver, in terms of its gold value, renders it necessary for me to give all figures regarding rents in lakhs of rupees, so that comparison of the amounts levied at different periods may be possible. Previous to 1865, a lakh of rupees was worth £10,000 or more, at present it is equal to £6,600, and the lesser value may be said to have been approximately current since 1887. Since 1898 the rupee has had a fairly steady artificial value of 1s. 4d., independently of the price of silver. In 1837, the rents of the occupied lands were fixed for thirty years at 21 lakhs of rupees, of which the Government received 17 lakhs, and the *zemindars* four. Owing to the Orissa

famine a new settlement was not made until 1897, when the rents were raised to 38 lakhs of rupees, of which Government takes $21\frac{1}{2}$, leaving $16\frac{1}{2}$ to the *zemindars*, who, however, lose under the new arrangement as they had been drawing the full rents of lands brought under cultivation since 1837. The average rent paid by the cultivator for the land in 1897 was found to be 2s. 9d. an acre.

All things considered, it is probable that the Orissa cultivator is in a better position than an English farm labourer. His income is small, but his wants are few, and he usually raises all the food required for himself and his family. His house is his own. He cannot be turned out of his holding so long as a very moderate rent is paid, and that rent can only be raised, at intervals of thirty years, and then by a Government official. As the population increases, and it tends to increase rapidly, there will be more pressure on the land, holdings will be divided and subdivided, and the standard of comfort will tend to decrease. There is, except near the sea coast, but little unoccupied land in British territory, but there are large tracts in the native states, and it is to be hoped that under the pressure mentioned there will be migration thither.

There is the spectre of famine, and very frightful that spectre becomes, when it actually arrives. My first introduction to Orissa was in the beginning of the famine of 1866, in which more than half a million of people perished; the mortality was frightful, the roads leading to Cuttack were strewn with the dead and the dying. There is one consolation, which is that so far as human foresight can judge, it is not possible for such a spectacle to recur. The mortality was due to two causes, firstly, the want of communications, and secondly, to the fact that since the commencement of British rule in Orissa, there had been no calamity of the kind. There was a tendency amongst the Calcutta officials to rely on the laws of supply and demand, the Government had not recognised its responsibility for providing food for the starving people, or how to arrange for the support of the hundreds of thousands for whom it was imperative to find food at or near their homes. There are no poor laws in India and, except in cases of famine, they are not required. But the responsibility of Government, in case of famine has, since 1866, been fully recognised, and ample experience in the management of famines has been acquired and put into practice in other parts of India; happily in Orissa, for the last forty years, there has never been more than local scarcity.

There is now no difficulty in respect to communications. In 1866 there was a main road, metalled in places, but crossed by numerous unbridged rivers, from Calcutta to Cuttack and thence to the Madras frontier, with a branch to Puri. There were no roads worthy the name from the interior to the sea coast, and the rivers beyond the influence of the tide are not navigable from November to July. Now there is a railway right through the province with a branch to Puri, two navigable canals from Cuttack to the coast, and thence water communication both by sea and canals and tidal rivers with Calcutta. There are large irrigation works by which some 200,000 acres are yearly irrigated. The canals are not financially profitable, as they scarcely do more than pay working expenses; in years of drought they are invaluable, sometimes in a single such year, saving crops of a value equivalent to one fourth or even more of their total cost. Such years are, however, rare; the average annual rainfall exceeds sixty inches, and is usually sufficient to bring the rice crop to maturity. The increased yield, and the certainty of good crops, would more than reimburse the cultivators for the water rates charged, but they have the same objection to incurring liabilities which it is possible to avoid which prevails elsewhere. I have been informed that last year, 1906, almost all the water which could be supplied was disposed of, so that the advantages, of what is mainly an insurance, are apparently becoming more and more appreciated.

My last five years in Orissa were spent in building the High Level Canal, which it was intended to carry on to Midnapore, whence there is a canal to the Hughli; the work was, however, found to be exceedingly expensive, and it terminates in the river Salundi, sixty-seven miles from Cuttack. The canal crosses two large rivers, the Brahmini and the Byturni, and many smaller rivers and drainages, so that it involved the construction of numerous large masonry works. My headquarters were on the Pilgrim Road, where it crosses the river Byturni; and cholera, I may say, was never absent, though it was sporadic rather than epidemic. There was no civil station or other Government officers living at the place. I preferred bread to *chapaties*, a kind of unleavened cake, and accordingly, amongst other servants, I kept a baker. A mutton chop involved the slaughter of a sheep, and there were other disadvantages incidental to the situation, which was probably the reason why I obtained, as a junior officer, a charge rather beyond what my standing in the Service justified. During the

cold weather I had occasional visitors, who were very welcome; but the place was difficult of access, and even official inspections were not frequent. I had an average of more than 10,000 workmen employed daily, and lots of varied occupation, so that I had but little time to bewail the want of society. The climate had its defects: the cold weather lasted two months only, December and January; on the other hand, the sea was only fifty miles distant; and there was, excepting in the rainy season, a refreshing breeze at night.

Orissa was, until the railway was constructed some seven or eight years ago, looked on as rather the "back of beyond," and the inhabitants have the reputation of being the Boeotians of India. They were the first natives of India, with whom I was brought into contact, and perhaps owing to my being stationed away from other Europeans, I became better acquainted with them than most Government officials; their good qualities as well as their deficiencies came under my notice daily. I have not lived in Orissa since 1875, but I have never ceased to have a kindly feeling for them and to look on Indians generally from what I may call an Uriya point of view. I think that I attained some kind of an idea what, under given circumstances, they were likely to do to-morrow, and I am quite certain that I never advanced so far with regard to the natives of any other part of India where I have resided.

Many Uriyas are employed in Calcutta; carrying palanquins used to be their special business, but since the tramways have started that mode of transit is fast disappearing. The jute and cotton mills are full of them, and many are employed by the Municipality on the waterworks and roads. It is very seldom that these men are accompanied by their families; usually, after working in Calcutta for a year or so, they return to their homes for a spell of rest. Some go to the Assam tea gardens and a good many to Mauritius and other British colonies, in which case they must be accompanied by a prescribed proportion of their womenkind. They are found all over Eastern India as bearers, a compound of housemaid and valet, and in this position they usually manage to become head servant and the disburser of small payments. Sterling, in 1846, remarked that in them the virtues of fidelity and honesty, according to their own ideas of these qualities, were conspicuous. I had one of these bearers, a milkman by caste, in my employment for thirty-five years. Early in my career, when living at Patamundi on the river Brahmini, a place, by the way, where the first missionaries to Orissa landed, I got a severe attack of fever. I

was the only European resident there, and this man promptly packed me in a palanquin, and I was carried 44 miles without a halt, save those necessary, every 8 or 9 miles, to admit of the carriers being changed. The bearer walked by my side the whole distance, and on arrival at Cuttack fetched a doctor, and not until I had been attended to, did he suggest that he might be permitted to go and eat. I can therefore bear testimony to their faithfulness and capability of bearing fatigue. This old man can read and write Uriya and Hindi, read Bengali, and has a slight knowledge of English, in which language I had a letter from him this Christmas. For all these talents, his remuneration, which was always somewhat above what I may call Trade's Union wages, varied from 16 to 24 shillings a month. Taken as a whole, the people are slight and delicate in build, but capable of great endurance in tasks within their powers.

With the exception of Cuttack, there is no large town in Orissa. Puri is an assemblage of lodging-houses clustered round the temple, and Balasore, which has some shipping, and the smaller towns, a conglomeration of connected villages, in which the usual routine of country life is followed; rice is brought from the fields and threshed, cows kept and village industries pursued. Town life is not popular, and most of the residents have small patches of land on the outskirts which they cultivate.

The Orissa manufacturing industry is not extensive. In old days cloth of great fineness, muslin, was woven and exported to Europe; now Manchester piece goods have supplanted country-made cloth, except the coarser kinds, which are said to be more durable than those imported. Potters who use the old-fashioned wheel abound. Many of the carpenters are really clever workmen, but the great majority of them are employed on work, such as making ploughs, rough doors and windows and common furniture, such as stools, beds and chests, not requiring much skill. Under European supervision they can build dog-carts and other carriages, copy from an illustration in a catalogue many articles of furniture, and, in a workshop, use most of the ordinary machine tools. They carve well, if given time and left to themselves. There are blacksmiths, brass-founders, and, on the hills, iron smelters on a small scale. They are good boat builders, and the masons are skilful, some of them being really expert carvers.

I may perhaps here tell a story as showing what could be done in Orissa as early as 1838. Just after the famine in 1867 the lighthouse-keeper at False Point complained that the Public

Works Subordinate, a native who had been sent to superintend the painting of the lighthouse, had misappropriated the good linseed oil provided for the purpose and was using poppy oil instead. There was no probability of the statement being correct, as poppy oil is the more expensive of the two, but I was directed to proceed to the lighthouse and to find out what was the matter. I soon ascertained that the real ground of complaint was that the Public Works Subordinate refused to fall in with the board-ship discipline which the lighthouse-keeper, who had at one time been mate on board a collier, had imposed on the small community of which he was the head, for he was customs and port officer in addition to his primary duties. The lighthouse is situated on an island, divided by a narrow creek from the mainland. Excellent oysters, a rarity in India, were to be had, and spotted deer were plentiful. The lighthouse-keeper employed a huntsman, who was expected to produce two deer for every three charges of powder and shot supplied to him, and, I gathered, suffered correction if his tale ran short. Tiger tracks were abundant, but I never saw a tiger. The situation has its own disadvantages: in the eighties the port and customs officials were drowned by a high tidal wave which swept over the island; their present quarters takes the form of a refuge house, with easy access to the roof both from inside and outside.

The lighthouse is 134 feet high, and built of laterite, a kind of red ironstone, plentiful in Cuttack. A tablet records that it was commenced on December 6th, 1836, and finished on October 16th, 1837. Light first exhibited March 1st, 1838, H. Rigby, Second Lieutenant, Executive Engineer. The lighthouse is seventy miles by river from Cuttack and upwards of two hundred by sea from Calcutta. Material, food and labour must have been brought from these two places, and contractors, if there were any, would be in England called gangers. The great majority of the workmen were certainly Uriyas, so that, even at that early date, they were capable of carrying out large works under competent direction which, in this case, can hardly have been experienced, as Second Lieutenant Rigby could not have been twenty-four years of age when he built that lighthouse. It seemed to me that young men in India sometimes got chances which they would not have obtained elsewhere. In my travels over some 700 to 800 miles of embankments, some of them in parts of the country seldom visited by Europeans, I found that three Government officers, and three only, were known to the natives everywhere even in the remotest parts.

They were Mills and Ricketts, the Settlement Commissioners, and Rigny the Executive Engineer who built the lighthouse, of whose charge the embankments formed a part. All of them had left Orissa more than twenty years before I heard of them. They must have been men of striking personality, as even then numerous stories were current as to their wisdom and affability. No doubt, it was mainly their accessibility and willingness to listen which my informants counted to them as wisdom, and rightly so, I think.

In the European sense society can scarcely be said to exist in Orissa. The tributary chiefs and large landowners, who mostly claim to be Rajpoots, take a position of their own, but even then, from a caste point of view, they are inferior to Brahmans, who may be, and often are, beggars in the sense that they subsist entirely on alms. Begging is not looked on as the disreputable occupation it is in Europe. The Uriya, in common with other Hindus, in practice admits his obligation to maintain his kith and kin to the remotest degree of relationship as well as the duty of bestowing some trifling dole on anyone who asks for it sufficiently loudly. Below the Brahmans, the intermediate castes of soldiers (*Rajpoots*) and physicians (*Baidya*) are nearly extinct. The writers, locally known as Mahantys, are the most influential section of the community after the Brahmans; they fill the greater part of the posts in Government offices, and are lawyers and teachers, a few of the more intelligent members of the lower castes have, however, qualified themselves for these positions and have established a footing. The pure castes, cultivators, milkmen, and others, from whose hands a Brahman will accept drinking water, follow, and then come the lower castes, fishermen, washermen, and some others; the despised castes, tanners, scavengers, etc., being at the bottom of the list. Only the pure castes are admitted into the Jaganath temple at Puri, but potters and washermen are allowed to enter the outer court, whilst the despised castes and hill tribes are altogether excluded, as are all Christians, Mohamedans and non-Hindus. There is one thing to be said of all castes of Uriyas, the lowest to some extent being excepted as regards petty theft, they furnish very few criminals, and in this respect Orissa is indeed a happy land.

In the higher castes women are married in their childhood; fifty years ago the Mahanty girls were not married until they were ten or twelve years of age, but infant marriage, the girl being from three to seven years old, is now the fashion, and if there is delay, it is owing to the difficulty of finding the money

wherewith to pay for the usual festivities. The cost falls on the father of the bride and it is a very heavy tax which it is not possible to avoid. The girl must be married before she is twelve years of age ; display, the giving of gifts, feeding and bestowing clothes on Brahmans, relatives and caste officials involve an expenditure which in Europe would be looked on as excessive, and frequently involves the parents in indebtedness for life. On the other hand, so far as the women of the family are concerned, the sacrifice is almost more than willing, and is tempered by no after regrets ; the event is recalled in the years to come, as the culmination of the family grandeur. In the higher castes re-marriage is out of the question, and a widow's lot is sad indeed, involving not only numerous penances, much fasting and coarse clothes, but the reputation of being unlucky and as such to be shunned at family gatherings. In the lower castes there is more latitude as to re-marriage. The women usually wear a good deal of jewellery, and unfortunately the children do the same, a custom which has led to many murders, children being decoyed to lonely places and then killed for the sake of their ornaments. The family jewellery is in fact the savings bank of the people, when times are good any savings are converted into ornaments, a statement literally true as the silversmith fashions the rupees, given to him, into the ornament desired, very often in the customer's verandah ; should hard times arrive the jewels are sold, and as their value consists mainly in the metal used, one anna in the rupee (one-sixteenth) being usually paid for fashioning, a good price is realised. The difference between the silver in the rupee and its nominal value as a coin has interfered with this form of thrift.

The children, I should say, are universally happy, their parents are kind and devoted to them, and food must indeed be scarce before they suffer ; the climate does not necessitate any large amount of clothing, and until they are five or six years old they are not troubled with any. There is lots of sunshine, ample room to play, and every effort is made to procure for them such amusements as may be had, which not infrequently consist of displays to which all are welcome. The household god is worshipped daily by libations of water and offerings of flowers, but otherwise their religious observances are confined to a few great festivals, on which occasions the people turn out in their thousands to visit the temples and have a kind of bank-holiday. The devotions do not include listening to addresses or reciting prayers ; offerings are made to the idols, alms bestowed on priests and mendicants and the religious part of

the festival is accomplished. The rest of the day is spent in visiting shops, shows and roundabouts and chatting with friends.

There is at present a college at Cuttack which educates a few of the more promising youths to the standard of the Calcutta University B.A. degree, and if on graduating the young man obtains a Government appointment, it is held that western learning has its uses. In the majority of cases I doubt whether their beliefs, tastes, or home life are influenced in any appreciable degree by the knowledge they have acquired. Material benefits such as umbrellas, kerosine oil, cheap cloth and railway travelling are welcomed, but how far the thoughts or scientific knowledge of the intruding European have been assimilated is a matter for conjecture ; diligent attendance at lectures or even satisfactory answers to examination papers do not, I think, afford any solid grounds for a reply.

I have endeavoured to give you some little information regarding the history of Orissa for a period approaching 3,000 years, and to roughly sketch the country and its people as they at present exist. The main features, in either case, are all that I could attempt to present, and to many of the statements made there are side lights and qualifications of all kinds and sorta. Even with a far fuller knowledge than I possess, the mystery of even a small part of India involves difficulties of which no European will ever possess the key.

The CHAIRMAN in proposing a hearty vote of thanks to the Author, which was carried unanimously, then made the following observations :—

My friend Mr. Odling's paper is of special interest to me, because between the years 1898 and 1903, when I was in Bengal, I went down into Orissa three times on inspection duty, and visited the important centres of Cuttack, Puri and Balasore, which are referred to at such length in his notes. On the first occasion I reached the capital by sea and canal, so that even less than nine years ago access to the heart of the Province was difficult. But before Mr. Odling and the irrigation officers constructed the canals, which, while primarily intended for irrigation purposes, can be used for passengers, it can be imagined that, although the district was in miles not very distant from Calcutta, it was not easy to travel far

state that if the women were provided, free of cost, with an outfit of clothes, those clothes as they wore out should be replaced, and leaves as a mode of dress abandoned. The first arraying of these ladies in strange garments was made the occasion of a state function. The women were paraded before my friend in their clothing of leaves and received their new raiments in his presence. They then retired to the jungle, clothed themselves in their novel dresses, and again passed before him in single line. As they came by their noses were smeared with red paint, and they were received into Hindu and civilised society. The men are armed with bows and arrows and matchlocks which, on more than one occasion, they have used with great pertinacity against the native soldiers of the Indian Army. They are at times a good deal harassed by the Hindu officials and traders, but there is a well-understood line which, if passed, is sure to lead to armed resistance. In 1869 I was living on the borders of one of these states when a small rising occurred, and from the account given to me some time afterwards by the brother of the Prime Minister, if I may so call him, I formed a very distinct opinion that my informant's brother, who was killed, had brought his fate on himself. At the same time I am bound to say that the general opinion is that the inhabitants of the native states are quite as well off as their brethren in British territory; there are occasionally cases of real and severe oppression, but the taxation is less rigid and if oppressive, it is both resented and evaded; the jungle is near and it is very easy to be "not at home" when the tax-gatherer calls.

Wild beasts exist in plenty. There are tigers, leopards, deer of several kinds, wolves, hyenas, an occasional bison and herds of elephants. I had the chance of witnessing an elephant catch conducted by my friend who ruled the Keonjhar State. For some reason or other, it was difficult for me to leave my post, and it remains one of my lost opportunities. The elephants were enticed into an enclosure by decoys—trained female elephants—then secured to trees, and a month after my friend appeared at my headquarters, which was fifty miles distant from the Keddah, with his catch of twenty-five elephants. I may here say that, with the exception of the elephant, the bison and some of the varieties of deer, the animals mentioned exist in less abundance on the plains. There are, besides, antelopes and buffalo; the latter has, however, I am informed, nearly disappeared. In the early days of the seventies they were numerous, as the sea coast was approached, and my own experience of big game

shooting has been mostly with them. They may be dangerous, especially solitary animals, who have probably been turned out of the herd on account of their fighting propensities. Alligators (both *muggurs* and *garials*) are plentiful. The winged game consists of partridges, jungle fowl, pea fowl, quail, snipe and wild ducks and geese. It is possible to get a good deal of excellent shooting in Orissa if sufficient time can be devoted to it, which with officials is rarely the case. One of my difficulties was early rising: when I appeared between four and five in the morning, my huntsman was wont to be very indignant at my not coming in the *early* morning.

We now come to the plains stretching from the foot of the hills to the sea, which are under direct British control. It was necessary to obtain from this part of the country a revenue sufficient to defray the cost of its administration. In 1870, as the result of elaborate inquiries, it was found that the family of a well-to-do agriculturist consumed food to the value of twelve shillings monthly, and that all their other expenses, clothes included, would be covered by another three shillings. The price of food in 1803 was from one-half to one-third of what it was in 1870, so that it was from a people, whose average expenditure was less than two shillings a head a month, that the cost of governing and protecting the country had to be found.

The main source of revenue was from the land of which the State was the owner, subject to the right of the cultivator to remain in possession on payment of a fair rent. In Akbar's time the land had been regularly surveyed, and each cultivator's rent fixed. This rent was collected by officials who were paid by commission, and who under English rule became *zemindars* (quasi landholders), with the right to collect the officially fixed rent from the occupiers, and the further right to settle tenants on unoccupied lands on their own terms. It was not until 1837 that a satisfactory settlement was made. The variation in the price of silver, in terms of its gold value, renders it necessary for me to give all figures regarding rents in lakhs of rupees, so that comparison of the amounts levied at different periods may be possible. Previous to 1865, a lakh of rupees was worth £10,000 or more, at present it is equal to £6,600, and the lesser value may be said to have been approximately current since 1887. Since 1898 the rupee has had a fairly steady artificial value of 1s. 4d., independently of the price of silver. In 1837, the rents of the occupied lands were fixed for thirty years at 21 lakhs of rupees, of which the Government received 17 lakhs, and the *zemindars* four. Owing to the Orissa

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century. Most of the people had been swept into the Church, many of them without any evidence of a change of heart or of comprehending the nature of the Christian life. Many had but a thin veneer of Christianity laid over a pagan soul. The Church was under the patronage of diplomatic and worldly statesmen, like Constantine the Great, who used it, as they used any other agency, to further their personal and political ends. The clergy were men of slight education and sometimes of inferior character. People generally were not adequately instructed in the Christian faith, and in any case the human heart easily becomes degenerate and degraded.

In 431 the third Ecumenical Council of the Church convened in Ephesus, the city of Diana. The phrase "Mother of God," used of the Virgin Mary, had already begun to be heard among the people of Asia Minor, and by this Council its use was officially authorised. Where has the Christian worship of the Virgin Mary come from? From the primitive pagan worship of the people of Asia Minor.

Among primitive practices still regnant, a leading place is claimed by sacrifice. Men feel alienated from God, they are burdened with a sense of sin, they feel helpless amid the dangers and trials of human life, and they yearn for an act of reconciliation and a means of acceptance. Moses did not so much require sacrifice of the Israelites as to regulate the offerings which their own hearts prompted them to bring.

Sacrifice may be offered by an institution or an individual; it is sometimes prescribed, but far more often voluntary; there may or may not be a ministering priest. In fact, the customs in vogue vary considerably, and the prescriptions and descriptions of religious authorities, even of the same man at different times, vary among themselves quite as much as do the Pentateuchal Codes. It is generally said that the animal must be a male, but females are sometimes used; it is preferable to secure the services of a priest, but if none is present the virtue of the sacrifice is not impaired; the priest should bless the salt last fed to the victim before its death, or if convenient the meat and other food placed on the sacrificial table; if the offering is made at a Dervish *tekye*, strict rules place it all at the disposal of the chief Sheykh, but a more liberal interpretation usually gives him but half, or a good piece of meat, preferably the right thigh, and the skin; all regulations assign the skin to the officiating clergyman, but in these years at the Courban Festival, the great annual Mohammedan sacrifice, all skins are claimed by the Turkish Theocracy for the benefit of the

Hedjaz railway, designed to carry pilgrims to Mecca ; yet at the Courban of last year I heard a preacher addressing a thousand men make a charge that half had hidden their sacrificial skins and half had sold them for personal gain ; some of the meat should be distributed among the poor and the friends of the worshipper, seven persons participating if you, a mathematical Occidental, wish to be particular.

To atone for sin known or unknown, to placate or win favour with the supernatural Being or beings, to inaugurate any important enterprise, to avert some dreaded disaster, to express gratitude for a prosperous season, or for deliverance from danger at sea or on a journey, sacrificial animals are slain, sacrificial blood is shed. When a building is erected, a sheep is slain "at the foot of the threshold"; money also is sometimes buried in the threshold: a bride walks into her new home through the blood of a lamb killed at the door; to prevent a raging conflagration from crossing a street, sprinkle it with sacrificial blood; and do the same to check the spread of pestilence.

Sacrifice in Asia Minor to-day is interpreted to mean "blood for blood, bone for bone, flesh for flesh, life for life." The death carries the idea of expiation for sin, a vicarious atonement, and the feast which follows is the convivial meal of those who enjoy satisfactory relations with God. Piacular and honorific elements thus are both habitually present in the act of worship, though naturally the emphasis may be laid upon one or the other; possibly upon one to the exclusion of the other. Wine, bread, and sometimes other food usually accompany the flesh on the table. The meat is never wasted by burning.

Some time ago I spent a night away from home, and was urgently requested by a Greek to come and see his son who was sick. The young man seemed to be in the last stages of tuberculosis, and, as the parents talked with such yearning, the mother said to me: "I vowed that if my boy recovered I would go to our monastery four days distant and offer a sacrifice there."

A ruddy-faced youth was one day absent from school, and when he returned he stated as the reason, "For carrying a sheep to the Armenian Monastery for sacrifice." The lad's father was dead, and the widowed mother had lost one daughter by reason of a fever, so when another daughter, aged about sixteen, sickened with fever, the mother was thrown into an agony of fear and vowed to offer a sheep if the child was restored to health. She was restored; and then the family repaired with near friends to the monastery, killed a

sheep by the help of a butcher, had a service in the church where the priest read prayers while the meat was cooking, after which the party sat down to partake of the sacrificial feast with glad hearts. They invited whomsoever they found at hand to join them, and gave a portion to the sexton, who would serve the officiating priest.

One of my friends, a Turk who is not rich, told me how he once was so sick that they thought he would die. He vowed if he recovered to offer a goat at a certain *tekye*, a Mohammedan monastery, and such a vow he holds very sacred. True, this man because of poverty has not yet been able to redeem his pledge, but when he is able he will kill a goat with sacrificial rites, cook the flesh and prepare suitable accompanying food. Then he will invite to the feast several *köjas*, relatives and neighbours, a prayer will be offered, and his friends will partake with him in the convivial, sacrificial meal.

In 1905 the spring rains were much delayed, and on a ride of fifty miles through the country just then, I found the villagers everywhere offering prayers and sacrifices for rain. One of them, a Shia or Alevi Turk, thus described to me their village custom. "We sacrifice for rain every year when May comes on a Friday. We have our place in the graveyard near our village. We owe our *evliya* (patron saint, from the Arabic *vely*) two sheep a year, which we kill and cook there. We also collect cracked wheat from every house and make a great caldron of soup; then we turn in all the passers-by and invite them to share with us of the village in eating of the food. With or without rain in season we have the ceremony, and please God, our rain supply is not deficient."

As some of these matters were once referred to in a Bible class, one student said that he had seen sacrificial blood smeared on the door of a Turkish house at the Courban Festival not long before. Another said that he had seen sacrificial blood struck in the form of a cross on the door posts of Greek houses in Trebizond, and that it is a frequent custom of the Greeks to make such crosses whenever they offer a sacrifice. Another student stated that he had seen such crosses put on the door of Armenians in Yozghat during the time of cholera. In all these cases sheep were the victims slain, but another member of the same class added that he had seen the blood of cocks killed in sacrifice marked in the form of the cross on the white walls of an Armenian monastery near Sivas. Christians, Greek and Armenian, Mohammedans, orthodox and sectary, all in the crises of life naturally turning to sacrifice for relief.

Belief in the intercession of saints is a prominent article in every Anatolian creed. Whether it be a relic from some era of polytheism, or an instinctive groping for beings with human sympathy and superhuman authority, or the result of some other cause, worship especially in cases felt to be really critical is frequently offered in the name and at the tomb or shrine of some saint. The saint is supposed to have been once an ordinary man, though of great sanctity, and now although dead and buried is very much alive, active in the neighbourhood of his sepulchre, merciful to his own people, who habitually worship the Creator by his agency, possesses great influence with the Almighty, is dangerous when offended, and his advocacy may be enlisted by suitable prayers, sacrifices and ceremonies. The site is often a high place; usually there is a shady tree at hand, or a thicket of bushes, and frequently a sacred spring also.

If a person is sick or maimed, fears a reverse or yearns for a child, he offers his plea with or without sacrifice, at the village shrine, or he goes a greater distance to a tomb of greater reputation, or he seeks a saint who has the name of suiting his particular need. The fall of an embankment or an old wall is attributed to a saint's turning in his grave. No robbery or other depredation may be committed there, and if a grove is near by its trees cannot be cut.

Some time ago the Governor of our city was on an expedition in pursuit of robbers. When he came to the region where they had been operating, he stopped with his retinue at the tomb of a saint, offered his petition, and vowed that if successful he would sacrifice there on his return. When he came back with the robber safely caught, he stopped again at the tomb and fulfilled his vow by the sacrifice of a ram. Piri Baba, who lived "five hundred, yes, six hundred years ago," said: "Let the redheads [*i.e. Shias*] seek their right of me." So redhead Turks come twenty days' journey to praise and pray at Piri Baba's tomb. If only the sepulchre of Moses were known, what crowds would have resorted thither, what structures would have been erected, what ceremonies would have been elaborated!

Not long ago a Turk with a reputation for learning and piety related to me how he was once sick unto death. The doctor whispered at the door that he had consumption of the liver and would die two hours before sunset. The sick man, writhing in pain, determined to make one more effort for life. He rose and staggered to a grave, in whose saint he had great confidence, and there poured out his soul in prayer that if possible his life might

be spared, but, if this could not be, that his soul might go direct to Paradise. In a few hours he was well; his pain was gone; and he rose and went to tell the doctor that there were remedies available when medical skill failed.

When I find myself in a region where I am a stranger and meet a man with whom to exchange greetings, I sometimes ask, "Isn't there a place named Khuddur Ellez near here?" And the answer usually comes, "Why, yes," and then follows a description of the place known by that name, which is understood to mean St. George, though there is some confusion as to the exact identity of St. George, and especially as to his relation to the prophet Elias, Ellez. St. George is venerated by Armenians, Greeks and Turks alike. I know a Khuddur Ellez visited by a whole village of Greeks on St. George's Day, and visited at all times by Turks, who pray and sacrifice there, especially for such children as are slow in learning to walk. The abundant candles of the Greek Church are said to be in honour of saints, and certainly the actual worship of the Greek Christians of Turkey is very largely saint worship. The same is true of the Alevi or Shia Turks, a great part of whose practical religion consists in their visiting *ziyarets*, or sacred places, and worshipping in the name of the saints buried there, with the aim of securing their merciful intercession. Mohammedans and Christians resemble each other in this part of their worship, and people of one faith often resort to shrines in the keeping of the other faith. I have seen shrines now Christian once Mohammedan, and, conversely, shrines now Mohammedan which were once in Christian keeping.

Corresponding to the lore connected with saints is that concerning *jinnns* or evil spirits. To the common Anatolian earth and air and sky are peopled with spirits malign as well as benign, and to neutralise the one is quite as important at the proper time as to utilise the other. A *mufti*, venerable in beard and furs, informed me that God created first the holy angels, then the devilish *jinnns* of seventy-two classes corresponding to the seventy-two races of men, and thirdly, God created man with character and possibilities partly angelic and partly devilish. The character of *jinnns* may be understood from the fact that one day after the afternoon call to prayer they destroyed eighty thousand prophets. This was before the creation of man! How there could be eighty-thousand prophets before the creation of man is a question that perhaps never occurred to the *mufti*, and if one should put it to him it might seem like needless homiletic nicety. For this transgression Allah wiped

the *jinns* out; that is, he wiped them out of *sight*, and now they are seldom allowed to appear to human eyes.

At another time my companion in travel was a white-turbaned Moslem teacher named Solomon. As we rode he related how the earth is full of *jinns*, which especially frequent streams, mills and lonely places, and lie in wait to work harm to men. They cannot enter a place, however, freshly trodden by oxen, as a newly ploughed field, though a fallow field is not thus protected. This notion is perhaps a survival of cattle worship. To avert their spell when one goes out at night he should "read" constantly, at any rate he should read (that is, repeat sacred passages from memory) just as he leaves the house door, and particularly as he puts on his shoes. If he does so he is safe for that walk, especially if he also gently blows in different directions, for blowing is very efficacious in warding off evil spirits, as also is spitting in any direction from which they may be feared.

Piles of small stones are often seen by the road-side, and passing travellers heap them higher to secure "travellers' luck." One theory is that the pile of stones holds down evil spirits and prevents their wreaking harm upon the passer-by. If by casting a small stone on a pile a driver may secure protection for a mile, it is a cheap form of insurance, when on any mile of road a horse may sicken, the wagon break down, or robbers waylay the driver.

If a person is believed to be possessed by an evil spirit, one form of treatment is to heat an iron chain red-hot, form it into a ring and pass the afflicted person through the opening, on the theory that the evil spirit cannot pass the hot chain and so is torn from his victim and left behind.

Dervishes are believed to call up familiar spirits amid the ruins of the frequent deserted castle and village sites by reading from their sacred volumes, and then to learn from these spirits where to dig for buried treasure. Or if a robbery has been committed, a dervish or *hoja* may be called, who for a small consideration will read over a cup of water in which some member of the family may then see black *jinns* and from them gain such information as, whether the thieves were male or female, young or old, tall or short, fair or swarthy, departed to the east or west, and the like. Acting on this information the parties endeavour to track the thieves and regain their property.

At Ghat, an Alevi village, a rather gruesome custom prevails. The *dedes* or Alevi priests there keep always in stock a moderate supply of serpents which are stored in a cave.

Whenever a person has erysipelas (the Turkish name for which means "little serpent") or a sore or wound that refuses to heal, he may, if he chooses, resort to Ghat. There he gives his name to the *dedes*, with a few piastres, and they open the door of the cave calling, "let the enemy of so-and-so come forth." When the first serpent appears it is taken to impersonate that enemy, and the victim of the disease attacks and kills it. He then returns to his home trusting that a hostile charm is broken, and that his cure will speedily follow.

Along with the "bondage through fear" of evil spirits may be mentioned the "bondage through fear" of the evil eye. This doubtless is a remnant of devil worship, and it is practically universal in Asia Minor. Indeed, the Yezidees of Eastern Asia Minor are alleged to be devil worshippers. Their theory is the negative one of trying to get through life without laying one's self liable to penalty or persecution. They are believed to hold that God will do a man no harm, being benevolent in disposition, and that if they can only "square" Satan and his coadjutors, if they can only keep the powers of evil inactive, they will fare well enough.

People generally are not Yezidees, but they avow and believe that if we say three-fourths of the dead in their graves are there by reason of the evil eye we would not be at fault. A person of short stature, light complexion and blue eye is sometimes made miserable by the apprehension which he rouses. People come and cut slivers from the threshold of his house as an antidote against his dreadful glance, and he may be compelled to renew his whole threshold several times every year.

To keep the evil eye from a child, blue beads are put upon it; to avert it from a field, a skull of some animal is erected upon a pole; to counteract its influence on a mill, a great placard, with the words "wonder of God," is nailed to the roof; to protect a dwelling, a bunch of garlic or a pair of deer's antlers is fixed in a conspicuous place; to prevent milk from souring, bits of charcoal are laid upon it; to protect a camel, its saddle is made of a particular kind of wood; and so forward *ad infinitum*. People's notions and fears of the evil eye vary with their environment and the degree of their general intelligence, but there is no marked difference traceable to religious connection.

I was once asked by a villager, whom I had never seen before, to tie a knot on a string he had wound around his wrist. It seems he had malaria, attributed it to some evil influence, and thought he might use me to bind the spell. His notion was

perhaps, not that I would hold an acceptable brief with the superhuman powers, but that I, as a Christian, would be so *unacceptable* as to render a service similar to that performed by a skull planted on a pole in a garden, whose unsightliness transfixes the evil eye, and leaves the tender plants to grow without harm.

Just as a bridal couple entered their home I have seen an old woman smash an earthen dish at their feet. Her idea was that as we observe human life we may safely infer that there are superhuman forces at work which are bent on smashing something. It is better, therefore, to get the start of their activity, to keep them quiet by doing their work for them, and lose the value of a cheap dish rather than endanger the health or property of the new household. If this superstition is not a survival of devil worship I know not how to account for it.

On the whole the power most trusted, whether as a prophylactic against or as a remedy for the ill effects of evil spirits or evil eyes, is "reading," that is, reciting from some of the sacred books. If a sheep does not come in from its pasturage at nightfall, read to protect it. Then if a wolf pursues it cannot catch the sheep; if it catches cannot bite it; if it bites cannot pull its teeth out, and the sheep will reach home dragging the wolf as its victim—or rather as the victim of the powerful reading. If the charm fails—God knows best.

A gipsy girl died, and her poor father attributed it to the effect of reading. The girl had been sought in marriage, but had refused, not wishing to marry at all. The disappointed suitor "read" over the flowing water of a fountain from which the maiden drank, doubtless to win her affection; but the water clove to her breast bone, and she sickened and died. Even the reading over her of a Christian priest and a Mohammedan imam could not save her.

Religious ideas are always seeking expression in connection with some visible, tangible object, such as a votive offering. A rag or a bit of rope or hair from the person of a sick suppliant at a sacred grave is usually tied to a sacred tree there, in the hope that the sufferer may leave his disease bound to the spot and go home without it. Parings of finger nails are preserved in secret places, such as cracks in the wall, and children's extracted teeth are driven into pillars in churches and mosques that new ones may come in well. At the tomb of Hussein Ghazi headache is treated by an attendant leading the patient seven times around the tomb, placing a string of wooden beads about his head, each of which is struck with a mace, and

then the aching head is sprinkled with dust taken from beside the grave. To exorcise an evil spirit, a quotation from a sacred volume is written—the greater the reputation of the copyist for holiness, the more efficacious his copy—the paper is burned, and the patient inhales the flame; or the paper may be reduced to pulp in water, and the whole given to the afflicted person to drink. People who dread a snake, or fear that they have been in some way bewitched, find a cast off snake skin, burn it and inhale the smoke.

A teacher called upon me one day bringing his son, a child, who had a tremendously swollen cheek, over which some astonishing ink marks were traced. The father explained that he had written a powerful quotation there in the expectation that it would reduce the swelling. A venerable gentleman of my acquaintance attributes his good health to the fact, that when he was a lad, a dervish wrote for him something on a paper, and had him lick off the ink. It has proved to be a cheap and effective medical prescription. A Greek boy attending a Protestant school became quite sick with malaria. His friends attributed it to the influence of his unorthodox teacher, and tried to persuade the boy to go and spit in the teacher's face, thus to repudiate and conquer his influence. The decent pupil's sense of shame was too much for him, however, and so his father bought a mulberry leaf to the teacher, asking him to spit on it, that the sick boy might spit over the spittle of the teacher and thus break the spell. Chance visitors at shrines will have their heads and bodies rubbed by the attendant with a pair of deer's horns kept resting on the grave, if they will allow it. Some Armenian villagers fix a certain kind of thorny plant in the form of a cross over the chimney of a house in order to prevent witches from coming down and strangling the little children. In some places they set a cross of wood in the chief window of a house at the vernal equinox, that the sun's rays as it crosses the line, and thereafter, may light the household across the holy symbol. Armenians often, and Greeks still more often, acting under the auspices of their respective churches, throw metal crosses, usually of silver or gold, into a pool, or into the sea, the young men dive for them, and whoever can bring up one is reckoned specially fortunate or blessed. Small presents are showered upon him, and the waters are accounted holy. The characteristic Christian symbol is put to more uses than can be recounted here.

All Anatolians value pilgrimage, whether the place of resort be Mecca, Jerusalem, Kerbela, where the late Shah of Persia.

was to be interred, or places of secondary rank like Damascus, or the Hadji Bek Tashi monastery, or some local shrine.

The Armenians of one region are wont to assemble on Cross Mountain at the festival of Vartavar in midsummer, which is interpreted as celebrating the transfiguration of our Lord, and partly also as recalling the flood of Noah. They may throw water over one another in memory of the flood, or release captive pigeons as Noah sent the dove forth of the ark, but why do they in some cases build fires, about which they walk seven times and then jump through the flames? And why do they in some places read from the Gospel at each of the four sides of the fire, and then take a burning stick and shake ashes from it on all the principal parts of the house, or strike it seven times on every person and animal at hand? Why indeed, unless the midsummer festival of the Armenians, which is traced by their own more intelligent men to the pre-Christian Armenian festival in honour of Anahid, preserves certain features of fire worship held by the early Armenians in common with their neighbours and kinsfolk, the Persians?

At Beuyurtlen in Pontus, Greeks from a hundred villages are said to gather on a mountain top in the summer of every year. There they spend the night in the open air, have religious services, led by the priests, in the morning dawn, they eat the food they have brought, and after enjoying to the full a religious picnic return to their homes.

Take another day in midsummer and visit a bald limestone ridge, a hundred miles from the last named place, and, if what eye-witnesses say is true, you will see another crowd, this time one of Redhead or Shia Turks, assembling to the number of thousands. There is a sheep for every house among the well-to-do, the animals are sacrificed, the meat is distributed to the poor and to friends, with plenty left over for the family that makes the offering. The date is determined by the beginning of the harvest in any given year, or as some affirm by the summer solstice, "the turn of the year." I have not yet been able to accept the invitation given me to attend and participate in this scene. There is more truth, however, than is sometimes realised in the claim of Shia Turks, that less than the thickness of an onion skin separates them from Christians. They are strongly affirmed by outsiders to practise a degenerate form of the Lord's Supper, but they are ignorant, low in the social scale, and in religious habits are secretive and deceptive. All the gatherings of religious clans, of which the above are samples, represent a mild type of pilgrimage. The more formal pilgrim-

age to the great world centres is enjoined by the various hierarchies, but this resort to local shrines is a remnant of pagan customs, for it is similar to what we know was practised in Asia Minor in the centuries preceding the Christian era.

The desire to forecast the future and the attempt to force the omens to assume a favourable character are impulses planted deeply in the human bosom. Books on this and kindred subjects, to the value of fifty thousand pieces of silver, were once burned in Asia Minor, but I suppose that any language of the Levant can still furnish books telling how to read the stars, the palm of the hand, etc. Old women in the city streets offer for sale collections of rings, seals and stones recommending certain ones as very powerful and sure to bring good luck. In Zile I saw a flat stone in a graveyard with a few pebbles on it, and a friend informed me that people often go to this stone, throw a handful of pebbles upon it with a prayer, and from the number of pebbles in a given space, or from the number as odd or even, or from the desigus as resembling letters of the alphabet, they predict a favourable or unfavourable issue to any undertaking in hand. A shop-keeper sometimes hires a person considered luck-bringing to be the first customer at his shop in the morning, hoping thus to secure good luck in business for the day. At a retired nook in the mountains is a peculiar hole in the thin edge of a huge rock through which people have tried to pass in such numbers as to have worn the rock smooth. Supposedly a sinner cannot pass; an innocent person can. The place also abounds in little stones: a person gathers up a handful, and expects to live as many years as he has stones in his hand. At the monastery of Sourp Minas visitors clap stones against a wall greasy from the candles which have been lighted and stuck against it, and if a stone adheres to the wall the owner is expected to be fortunate. When a dog rolls before the door of a sick man it is thought that he has seen the angel of death; and so in the house of a sick man bread is kept ready to throw to the dogs to prevent them from rolling before the door.

There are traces remaining of a primitive agricultural religious year. Praying for rain in the Spring, already referred to, is a custom which has a wide and deep hold. Fixing crosses in the windows at the Spring equinox, or holding a festival at the beginning of harvest, which coincides almost exactly with the Summer solstice, has the same significance. A day in Spring is called "mouse day," and no work, especially no weaving, is done on it by the women lest mice gnaw and spoil the result.



No. 1.



No. 2.



No. 3.

Special forms of Christian prayer are in use for that day. Grapes, which next to wheat are the agricultural product most prized in Turkey, are blessed in all the Armenian Churches at the feast of Astvadzadzin, the feast of the Mother of God, which fell in 1906 on August 26th. Many devout Armenian women eat no fruit from Lent until Astvadzadzin, and in general Armenians do not eat freely of the grapes, if at all, until they have been blessed in the Church.

These are specimen facts from the beliefs and practices of our friends, the people of Asia Minor. They indicate a real sense of sin and helplessness, of fear and failure, a groping for peace, comfort and reconciliation with God. And yet my experience is that however learnedly Anatolians discuss religious principles, however devotedly and at whatever cost of money, time and effort, they fulfil the rites which the custom of immemorial ages has prescribed or the self-sacrifice which conscience urges, they have no satisfying confidence in any. They have no consistent way of salvation; they have no clear idea of a personal Saviour.

This address has aimed to deal with nothing characteristically Christian or Mohammedan, nothing directly from the Bible or the Koran. It has dealt rather with facts as they have come under the writer's personal observation; questions of cause, comparison and anthropological significance may be left to scholars who specialize in such subjects.

NOTES ON THREE PHOTOGRAPHS.

- No. 1. Eyuk, Central Asia Minor. A pair of Hittite sphinxes guarding a temple door, one now surmounted by a stork's nest. Each sphinx about eight feet in height; a double-headed eagle supporting the figure of a priest on the inner wall of the right-hand sphinx. Date, 1200 to 1400 B.C.
- No. 2. Eyuk, Central Asia Minor. Sacrificial scene, near the temple door, being part of the approaching dromos. Altar, before which stands a ministering priest with a musical instrument (?) in his right hand. Bull on the other side of altar, for sacrifice or to receive the sacrifice as a cattle god.
- No. 3. Boghaz-keuy (Pteria), Central Asia Minor, fifteen miles from Eyuk. Two figures in the smaller Yasili-Kaya gallery, the taller with ribbed cap, being a female, probably a mother-goddess, her left arm being thrown around the neck of the younger, smaller figure, her consort, and perhaps her son. Hittite winged solar disc in upper ground; figures with tip-tilted shoes. Date, 1200 to 1400 B.C.

DISCUSSION.

The SECRETARY (Professor HULL, F.R.S.), in moving a vote of thanks to the author, said,—I wish to be allowed to express my gratitude to the Rev. Mr. White for his interesting communication. It is not the first with which he has favoured the Institute, as he sent us a paper in 1901 published in the *Journal of the Society*.^{*} Since then he has been appointed to the important position of Dean of the Anatolia College—and it is gratifying to know that this institution is in such a flourishing condition, and is doing such good work amongst the Christian population of that historical region. We can never forget that Asia Minor was the country of the Seven Churches of the Apocalypse—and it is lamentable to hear how the nominal Christians have fallen away from the simplicity of the Apostolic faith. To that faith American Missionaries are endeavouring, and not without success, to recover them—and we all join in congratulating the Dean on being selected to preside over the College which is taking so important a part in the evangelisation and the spread of knowledge amongst the people of Asia Minor.

There is another reason why we should take a special interest in the intellectual prosperity of this country—from the connection with it in recent times of our late friend, General Sir Charles Wilson. It will be in the recollection of some of us that this distinguished officer was appointed to be Consul-General of Anatolia under the Anglo-Turkish Convention, a position which he held from 1879 to 1882. It was doubtless due to the influence of the British Plenipotentiaries to the Berlin Congress, the late Lords Beaconsfield and Salisbury, that Sir Charles Wilson was appointed to this position, for which he was peculiarly fitted by his familiarity with Oriental populations, and his mature and considerate judgment, and I venture to think that if he had been allowed to remain for some years longer in that position of peaceful influence those terrible massacres of the Armenian population from 1893 to 1896 by the

^{*} "Visit to the Hittite cities of Eyuk and Boghaz-Keoy," *Trans. Vict. Inst.*, vol. xxxiii.

Turks which afterwards took place would have been averted.* It is very gratifying to hear from the author of this paper, that the bearing of the Turkish rulers towards their Christian subjects has so much improved, and that, although not open to the reception of the Gospel themselves, they do not offer any opposition to evangelical teaching amongst their Christian fellow countrymen.

Dr. E. CLAUDE TAYLOR.—I wish to add testimony to the value of the work at Anatolia College by the American Missionaries and their Armenian and Greek colleagues. In the midst of ignorance and superstition it is splendid to see the growth of knowledge and spiritual feeling. It is specially noticeable in the second generation. Further I would like to suggest that if any member of the society felt able to pay a visit to Anatolia College he would be able to help them in many ways by encouragement and support, and he would find the experience, along out-of-the-way paths, most enjoyable.

Colonel HENDLEY said that he also had much pleasure in testifying to the great value of the work done by the American Missionaries in Turkey. When he was in Constantinople a few years ago he had not only heard from old residents of the good that they had effected in Asia Minor, but of the special importance of their labours in Bulgaria, where their educational institutions had been the means of so improving the powers of mind of the youth of the country that it was expected that, in a very few years, the population would be in a position to resist all oppression, whether at home or abroad. What was wanted was the formation of a strong backbone, as it were, and this was being done by the missionaries.

Canon GIRDLESTONE said that the Turkish Empire owed a great debt to the American Mission. With regard to the title of the

* It may be mentioned in this connection that after the massacre of the Armenians, in 1896, a committee of ladies was formed in London to rescue and assist the unhappy Armenian widows and children, and a large number were taken in British ships to Cyprus. Miss Charlotte Hull, M.D. (now Mrs. Ferguson-Davie), was sent out to take charge of these destitute people, and she fitted up a large house—given over by the governor to her—as a hospital and home, where for several months Miss Hull and her assistants ministered to the wants of their charge, both in food, clothing and medical aid, until they were enabled to return to their country on the restoration of peace.

paper, the word "primitive" was ambiguous. It might mean "ancient," but it might also mean "original." There was a tendency at the present time to regard the most degraded and superstitious cults as nearest to the original. This idea was to be deprecated.

The author had omitted direct reference to the Jewish religion. But many members of the Hebrew race had found their way into Asia Minor at least as far back as the days of Joel; and various rites referred to in the paper looked like reminiscences of Jewish ceremonies.

After referring to the Goddess Ma, who might be identified with the Egyptian Goddess Thmei, who was also called Ma, he called attention to the possibility of finding standing stones in Asia Minor similar to those discovered in Palestine.

Colonel C. E. YATES, C.S.I., C.M.G.—With reference to what the Lecturer has told us regarding the custom of sheep sacrifice in Asia Minor, I would just mention that a similar practice is common throughout North-Eastern Persia. When I was Consul-General at Meshed I travelled a great deal throughout that part of the country, and it was a common thing to find myself welcomed on arrival at any place by the sacrifice of a sheep as I alighted from my horse. Also when paying a visit to any local chief or man of importance I often found my host waiting for me at the outer door with a sheep whose throat was cut just in front of me as I arrived, so that I stepped over its blood as I entered his house.

This custom is mentioned, I think, in my book *Khurasan and Sistan*, published by Blackwood in 1900.

The vote of thanks having been put from the Chair, was carried unanimously, and the author having briefly replied, the meeting separated.

ORDINARY GENERAL MEETING.*

COLONEL T. H. HENDLEY, C.I.E., IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed.

The Rev. William McKibbin, D.D., LL.D., was elected a member, and the following paper was read by the Secretary in the absence of the Author :—

PLANT-DISTRIBUTION FROM AN OLD STAND-POINT. By H. B. GUPPY, M.B., F.R.S.E. (Honorary Corresponding Member.)

IN this paper I have elaborated a theory of plant-differentiation which is briefly outlined in the preface and final chapter of my recent book on Plant-Dispersal. It is based on the view that observation can only discover the differentiation of types, the agencies concerned with type-creation being not evident to us.

Many of the most serious difficulties connected with the study of plant-distribution have their origin in the endeavours to discover the centres of dispersion or the homes of genera, tribes, and families, difficulties that are often intensified when we call in the aid of the geological record. Botanists appear to have been more persistent in this direction than zoologists; and we have something to learn from the circumstance that those who have taken the broadest views of distribution have often troubled themselves least with such speculations. If the standpoint adopted in this paper is correct, all such endeavours are misdirected and vain, since the difficulties would arise from an initial misconception of the problem.

The difficulties in distribution created by a misconception of the problem. Let us glance at a few of the difficulties that take their origin from the hypothesis that a genus can only have a

* Monday, April 8th, 1907.

single birthplace. *Ravenala*, a genus of the *Musaceæ*, offers us very singular instance of disconnected distribution. It contains only two known species, of which one (*R. madagascariensis*) is the Traveller's-tree confined to Madagascar, whilst the other (*R. guianensis*) is restricted to tropical South America. Then there is the genus *Adansonia*, to which the familiar Baobab-tree belongs. Of its four species, two are African, one belongs to Madagascar, and the fourth is Australian. Then we have the genus *Mesembryanthemum*, which, though mainly African, possesses a few Australian and South American species. Again, the breadth of an ocean lies in each case between the South American, Australian, and African species of *Podocarpus*. These examples have been selected because they raise the same questions that are suggested by the disconnected distribution of animals like the marsupials and the tapirs. Evidently we are not here concerned with capacities for dispersal.

The testimony of the rocks only adds to our difficulties in the search of the home of a genus. What are we to say, for instance, when many living genera of trees, both tropical and temperate, such as *Eucalyptus*, *Ficus*, *Liriodendron*, *Myrsine*, *Quercus*, etc., present themselves in association and without warning in the Cretaceous deposits of North America? How is it possible, again, to speculate on the home of *Eucalyptus*, when we know that it existed in Mesozoic times both in Europe and in North America? As far as concerns their former wide dispersal, the marsupials and the gum-trees behave in a similar fashion. Where, it may be asked, ought we to look for the home of *Liriodendron*? Found fossil in the Cretaceous and early Tertiary deposits of North America, Greenland, and Europe, its once numerous species are now only represented by a solitary species growing in North America and China. It would seem, indeed, with this evidence before us, that it is not legitimate to raise the question of a home at all.

But the difficulties are not restricted to the disconnected distribution of genera. The distribution of families presents almost insuperable difficulties when viewed from the standpoint of dispersion from a centre. It would indeed appear that the farther we trace them back in geological time, the wider is their range. Where, for instance, should we look for the home of the palms at present flourishing throughout the tropics but extending far north into temperate latitudes during Eocene times?

With some of the families that are well represented in the geological record we cannot even detect the commencement of the differentiation of their tribes. With the *Taxaceæ*, for

example, most of the tribes established by the systematist for living forms are to be found in the Mesozoic deposits (see Pilger's "Taxaceæ," *Das Pflanzenreich*, iv, 5). With a family like the Aceraceæ, which practically consists of a single genus (*Acer*), the sections or subgenera based on the characters of existing species include all the Tertiary forms; and, stranger still, most of the sections of the genus that were confined to one or other side of the Atlantic in Tertiary times possess the same distribution now (see "Aceraceæ" by F. Pax, *Das Pflanzenreich*, iv, 163). We seem indeed to be rarely able to get at the beginning of things in the distribution of the flowering plants, whether it be a family, a tribe, or a genus.

THE FIRST POSTULATE OF THE THEORY OF DIFFERENTIATION.

In those families where we get a glimpse of the differentiation of the tribes we are apparently brought face to face with the differentiation of a world-ranging primitive stock. This is a point of the greatest significance in connection with the standpoint adopted in this paper. If behind the facts of distribution lies the cardinal principle that the farther we trace a type back the more generalised are its characters and the wider is its range, then we should be justified when working out the history of a family in postulating a world-ranging primitive parent type with the subsequent development of centres of differentiation over its area. The means of dispersal would then take a very secondary place as determining distribution except in the case of insular floras. This is the position which I will first endeavour to establish in the elaboration of the theory of differentiation. It will involve the possibility of the development of tribes and even of genera in more than one locality in the area of the family.

THE VIEWS OF MR. BENTHAM AND PROFESSOR HUXLEY.

I will first refer to some of the indications supplied by the great group of the Compositæ. Notwithstanding that it makes a poor show in the fossiliferous deposits, Mr. Bentham, the monographer of the family (see *Journ. Linn. Soc. Bot.* xiii, 1873), arrived at the conclusion not only that it is a very ancient plant-group, but that its primitive stock was already widely dispersed at an early period of its history. Both the Old and the New World possessed the family at the earliest recognisable stage, America, South Africa, the Mediterranean region, and Australia serving subsequently as "centres of differentiation" and becoming the homes of the tribes. The possibility of

the differentiating process following the same lines at its early stages in distant parts of the world is clearly indicated in these conclusions, though it should be noted that this is not Mr. Bentham's interpretation. Although admitting the very ancient distribution over the world of the primitive stock, this botanist looked for the still earlier centre of dispersion, or, in other words, for the home of the family.

Now, it is noteworthy that Professor Huxley, Mr. Darwin's great lieutenant, in his remarkable paper on the Gentians (*Jour. Linn. Soc. Bot.* xxiv, 1888), which as a display of method may be regarded as a prophetic leap through two decades, would have nothing to do with centres of dispersion, or with movements of migration in explaining the distribution of this family. In two letters, giving some of his preliminary results, which were written to Sir Joseph Hooker in September, 1886, he says. . . . "It is clear that migration helps nothing as between the Old World and South American Floræ. It is the case of the tapirs (Andean and Sino-Malayan) over again" (*Life and Letters of T. H. Huxley*, second edition, 1903, ii, 464-5). His more matured opinions are given in his paper where he says . . . "The facts of distribution of the *Gentianæ* . . . are not to be accounted for by migration from any 'centre of diffusion,' to which a locality can be assigned in the present condition of the world," and he recurs again to the parallel case of the tapirs, pointing out that with those animals "there have been no migrations, but simply local modifications of the genus at opposite ends of the primitive area, with extirpation in the intermediate space." The species of the world-ranging family of the Gentians fall, he says, into four groups, one primary and "least differentiated," to which the South American, the Antarctic, and the Arctic forms mostly belong, and the other three groups "specialised" and comprising the species of the rest of the northern hemisphere. There is, he remarks, "a strange general parallelism with the crayfishes" which, though widely distributed, "become most differentiated" in the northern hemisphere.

Like Mr. Bentham with the Compositæ, Professor Huxley regarded the Gentians as distributed over the world ages since, and this is a most important point for our theory of differentiation. The study of their means of dispersal would have been, no doubt, characterised by him as interesting, but unimportant. The existing Gentians he regarded as the relics of a widely spread Tertiary flora ranging over the two Americas and Eurasia. Like Mr. Bentham again, he is able to dispense largely with geological evidence, and, on *a priori* grounds, finds no

reason to suppose that the distribution of the Gentianeæ in Miocene times was substantially different from what it is now. As concerning the possibility of putting a limit to this retrogression, he "does not think that any good grounds could be given for denying the existence of even the more specialised Gentianeæ in the Cretaceous epoch, whilst the *Ur-Gentian* (the hypothetical anemophilous parent type) may be dated back almost as much further as probabilities permit us to carry the existence of flowering plants." Professor Huxley's temerity was Homeric, since not only did his method of dealing with the genera on purely genetic lines involve the fate of the accepted arrangement of the family, but he extended his conclusions at a bound to the plant-world in general, and terminated his paper with the warning that a revision of taxonomy and distribution from the point of view of the evolution doctrine would hardly fail to revolutionise both.

It will thus be seen that on its biological side there is nothing original in the theory advocated by me in this paper. Though Huxleyan, it is not Darwinian, as will immediately appear.

The possibility of the development of the same form in different localities.—It has already been explained why Professor Huxley made no effort to determine the home of the Gentians. According to his views, this ancient family had differentiated from a primitive type in such a manner that he considered it probable that not only the larger tribal groups, but also the genera could have originated independently in different localities. In this connection, it should be noted, Professor Huxley came into line with Dr. Engler, whose work on the history of the development of the plant-world,* he had been recently reading. If we postulate, as was done by Professor Huxley, a primitive generalised type of a family, we are compelled to admit that in its earlier stages the differentiating process might follow similar directions in different localities. A tribe, and at times even a genus, might thus arise in more than one region; and if the primitive type were universally distributed, we might have the same tribes and genera originating on opposite sides of the globe. But we should be straining the argument if we endeavoured to urge that this was the general rule. Naturally, the chances in favour of such an occurrence would decrease with the progressive differentiation of the primitive type. It would be probable with the tribe, possible with the genus, and almost impossible with the species.

* *Versuch einer Entwicklungsgeschichte der Pflanzenwelt*, 1879–82.

Table showing the distribution of the species, genera and tribes both the Old and

The figures for the Compositæ are those given by Mr. Bentham in his have been prepared by myself from the materials supplied in the mono-

Families. (S = sub-family.)	Species.			
	Old World.	New World.	Common to both.	Total.
Cistaceæ	118	35	—	153
Aceraceæ	80	14	1	95
Halorrhagaceæ	116	31	5	152
Lythraceæ	143	302	6	451
Compositæ	4,858	4,463	63	9,384
Primulaceæ	446	71	15	532
Myrsinaceæ	613	319	—	932
Symplocaceæ	172	109	—	281
Monimiaceæ	84	166	—	250
Betulaceæ	58	18	6	82
Taxaceæ	78	18	1	97
Marantaceæ	79	205	1	285
Zingiberaceæ	761	89	—	850
Musaceæ	49	30	—	79
S. Orchidaceæ (Pleonandræ)	76	24	2	102
Alismaceæ	20	48	2	70
Scheuchzeriaceæ	11	2	4	17
Naiadaceæ	22	8	2	32
Typhaceæ	6	1	2	9
Sparganiaceæ	8	3	4	15
S. Araceæ (Pothoideæ)	76	495	—	571
Juncaceæ	136	111	34	281
Eriocaulaceæ	152	396	2	550
Total	8,162	6,958	150	15,270
Percentage	53 p.c.	46 p.c.	1 p.c.	—
Percentage for <i>Compositæ</i> alone	52 p.c.	47 p.c.	1 p.c. (0·7)	—
Percentage for all the families except <i>Compositæ</i> .	56 p.c.	43 p.c.	1 p.c. (1·5)	—

Explanation of abbreviations in the last column.—C = cosmopolitan ; hemisphere, chiefly in temperate latitudes ; S = southern hemisphere, regions.

(when established), of twenty-three families that are found in the New World.

monograph of the family (*Journ. Linn. Soc.*, 1873). The other results graphs of Dr. Engler's *Das Pflanzenreich*.

Genera.				Tribes.				
Old World.	New World.	Common to both.	Total.	Old World.	New World.	Common to both.	Total.	
4	2	1	7	—	—	—	—	N.
—	—	1	1	—	—	—	—	N.
4	1	2	7	—	—	3	3	S.
6	11	5	22	—	—	2	2	Tr.
309	343	78	730	1	—	12	13	C.
10	2	10	22	2	—	3	5	N.
21	8	3	32	1	—	2	3	Tr.
—	—	1	1	—	—	—	—	Tr.
20	6	1	27	—	—	5	5	Tr.
1	—	5	6	—	—	2	2	N.
6	1	3	10	3	—	2	5	C.
15	10	1	26	—	1	1	2	Tr.
34	2	2	38	2	—	2	4	Tr.
4	1	1	6	2	1	1	4	Tr.
4	2	1	7	1	—	1	2	C.
7	—	5	12	—	—	—	—	C.
1	2	2	5	—	—	—	—	C _T .
—	—	1	1	—	—	—	—	C.
—	—	1	1	—	—	—	—	C.
—	—	1	1	—	—	—	—	N.
8	2	—	10	4	2	—	6	Tr.
1	3	4	8	—	—	—	—	C _T .
1	6	2	9	—	—	2	2	Tr.
456	402	131	989	16	4	38	58	
46 p.c.	41 p.c.	13 p.c.	—	27 p.c.	7 p.c.	66 p.c.	—	
42 p.c.	47 p.c.	11 p.c.	—	8 p.c.	0 p.c.	92 p.c.	—	
57 p.c.	23 p.c.	20 p.c.	—	33 p.c.	9 p.c.	58 p.c.	—	

C_Te = chiefly in the north and south temperate zones ; N = northern chiefly in temperate latitudes ; Tr = chiefly in tropical and subtropical

Such a scale of chances is directly indicated in the foregoing table. Here we perceive that in a sample number of the families that are distributed in both the eastern and the western hemispheres, about two-thirds of the tribes, 12 or 13 per cent. of the genera, and one per cent. of the species, are common to the Old and New World. I have added this table, since it gives the data on which this important inference is based. The mere outlining of the numerous principles involved in its columns would afford material for a paper of some length, so that I will make no further reference to it here.

It is strange that the old doctrine of multiple centres was supported by a great Darwinian evolutionist. It was held by Sir William Dawson, a leader of the opposing school, who in one of his last works (*Some Salient Points in the Science of the Earth*, 1894), observed that the upholders of the theory of Natural Selection would "get rid of many difficulties of time and space," if they would admit the possibility of more than one centre. Like Professor Huxley, Sir William Dawson believed in the differentiation of "generalised or synthetic primitive types"; and since they both held the doctrine of multiple centres, they were fighting for the same cause, though oddly leading contending factions.

In this connection it is important to notice that in some families where the monographer has worked on genetic lines, similar to those adopted by Professor Huxley in the case of the Gentians, the same possibility of the independent development of plant-forms over the area of the primitive type presents itself. For instance, with the Eriocaulaceæ, the type-genus (*Eriocaulon*) from which Ruhland traces the descent of all the other genera of the family, is the only genus that is universally distributed.* So also with the Juncaceæ, the sub-genus which is regarded by Buchenau as nearest to the parent-type is widely spread over the world.† Now, it cannot be pretended for a moment that these forms, which come nearest to the original type of the family, are indebted for their wide distribution over the area of the said family to their exceptional capacities for dispersal. Rather ought we to assume that they have been developed *in situ* over the area originally held by the primitive type of the family, that they represent the earliest stage of the differentiating process, and that they have in their turn given rise to various centres of differentiation from which the other more

* "*Eriocaulaceæ*," by W. Ruhland, *Das Pflanzenreich*, iv, 30; 1903.

† "*Juncaceæ*," by Fr. Buchenau, *Das Pflanzenreich*, iv, 36; 1906.

localised groups (generic or otherwise) have been developed. The same process may be seen in operation within the limits of a genus. Many tropical genera, as I have shown in my book on *Plant-Dispersal*, possess in addition to the more localised species, a highly variable species that occupies the range of the genus, and establishes centres of differentiation all over the area.

It can scarcely be doubted that if we begin by postulating a world-ranging, generalised type, which in the course of ages differentiates *in situ* into tribes, genera, and species, we should be spared a sea of trouble in the investigation of plant-distribution. All the difficulties of disconnected distribution would disappear. Many botanists must have at times felt the need of an hypothesis of this kind, though few would be prepared to abandon the old position. Amongst those who in recent years have revolted against the habit (to use the words of Sir William Dawson) of laboriously devising expedients for the migration of plants and animals is Dr. Karl Mueller.* With the case of *Liriodendron* in his mind, he observes that "all explanations of origin by migrations and bridges cease, and we are forced back on the idea of autochthonous causes." So, again, the occurrence of a species of Baobab (*Adansonia*) in Australia and South Africa causes him to remark that "the enigma cannot be explained by migration; the same conditions of creation produced in different places the same type, only in different species."

DIFFICULTIES CONNECTED WITH FAMILIES.

But apart from questions connected with genera, many difficult problems concerning families appear much less formidable when we regard them from the standpoint of the differentiation theory. There is the matter of large and small families. Take, for instance, a great family like the Araceæ, distributed all round the globe, and possessing a multitude of genera. Then take a very small family like the Columelliaceæ, containing only one genus, limited to Ecuador and Peru. The family characters of the Araceæ are those of the undifferentiated primitive type. Where, we may ask, are the primitive family characters of the Columelliaceæ? They exist, but only as expressions of a simple family type, the genetic connections

* See *Trans. and Proc. New Zealand Institute*, xxv, 1892, for a translation by H. Suter of Dr. Mueller's paper in *Das Ausland*, July 20th, 1891.

with which have been disguised by later modifications. To raise a specialised genus to the dignity of a family is to reverse the natural order of things. It will be pointed out later on that nature seems to have reversed the regular process of differentiation in Oceanic islands, and in other localities where conditions of abnormal isolation prevail; but it will be shown that it is not nature that has reversed her processes, but the botanist that has changed his methods. If we accept the single-centre hypothesis, the birth of families presents itself as a very haphazard operation. One ranges the world, whilst another is confined to the tropics, a third to the north and south temperate regions, a fourth to only one of the temperate zones, a fifth to North America and Eurasia, a sixth to one continent only, and so on. By regarding these matters from the standpoint of the differentiation theory, we shall see that the difficulties have been largely created by ourselves, more especially through the loose employment of the term "family."*

We have first a world-ranging family, like the Compositæ, where the various tribes, differentiating *in situ*, collectively occupy the area of the primitive type. In other cases, however, differentiation has proceeded so far that the original tribes are ranked as families by the systematist; and we obtain a series of related families, each in its own region, but together holding much of the area of the world-ranging original type. Thus the closely related families of the Primulacæ and the Myrsinacæ, the first of the temperate regions, the second of the tropics, may represent the tribes that indicated the first step in the differentiation of a parent type that was once generally distributed over the earth when climatic conditions were more uniform than they are at present. Just as we may regard a widely distributed family like the Compositæ as representing in its tribes, genera, and species the history of the differentiation of flowering plants and of their conditions of existence on the globe, so we may see in the closely related Myrsinacæ and Primulacæ and in their respective genera and species the result of the differentiation of plant-forms and plant-conditions since the era of flowering plants began.

The custom among systematists of linking families together in such a way as to suggest a genetic connection offers evidence in favour of the differentiation hypothesis, more especially in

* Families should be ranked in grades according to their relation to the parent type. So also as regards genera and species the same system should be used.

those cases where the families concerned, though each in its own region, hold much of the globe between them. A striking instance of this has just been given; and another is noted below in connection with the primitive group of the Scitamineae.

A good test of the efficacy of the differentiation theory is afforded by those families that are widely spread over the warm regions of the earth, yet stand well apart from all other families. Such families occupy regions now separated by the breadths of the Pacific and Atlantic oceans. Let us, for instance, take the Palmaceae. The palms are numerous in tropical Asia and in tropical America, and we know that they extended in mass much farther north during the Tertiary period. What encouragement, therefore, can the facts of distribution afford us in searching for the home of the family, when they indicate that the farther we go back the wider is the range? To attempt it would be at once to involve oneself in a labyrinth of assumptions both geographical and botanical. Far fewer difficulties would attach themselves to the explanation supplied by the differentiation hypothesis that there was originally a world-ranging palm prototype which has differentiated *in situ* in various regions, and that its present concentration in equatorial regions is connected with the differentiation of the climate of the globe.

The Palmaceae offer a suitable and familiar illustration of the argument here followed; but it would be easy to mention other tropical families distributed around the globe, where the attempt to discover a centre of development would be equally futile.* This could only be in any degree successful in the case of those more localised tropical families which belong to a group of closely related families, and are really the tribes of a primitive family that has disappeared in the process of differentiation. A good example is afforded in the case of

* As another instance I will take the Monimiaceae, a family confined to the tropical and subtropical regions of the Old and the New World, and described by its recent monographers (Perkins and Gilg in *Das Pflanzenreich*, iv, 101, 1901) as so well defined and so natural in its characters that all its species may be regarded as derived from a single Old World stock that probably had its birthplace in Indo-Malaya. Since, however, all the five tribes are common to the Old and the New World, whilst one-fourth of the genera and two-thirds of the species are purely American, such an explanation raises a host of difficulties. According to the differentiation hypothesis, we should merely begin with a primitive parent type originally diffused in both the Old and the New World and subsequently differentiating at unequal rates.

the four closely connected families, the Zingiberaceæ, the Cannaceæ, the Marantaceæ, and the Musaceæ, which behave as tribes of the great plant-group of the Scitamineæ, once distributed (as assumed by the theory) as a generalised type over the warm regions of the earth and now represented by its original tribes as separate "families" in the different parts of its area.*

As another illustration of the working of the differentiation theory, I will take a family like that of the Pandanaceæ, that is restricted to the warm regions of the Old World, and displays but slight relationship to other families, excepting, perhaps, to the Sparganiaceæ of temperate latitudes. Here we would suppose that the differentiation of the original world-ranging type has advanced so far that the type has been lost seemingly beyond recognition. Until we can discover the representatives of the Pandanaceæ in tropical America we can only frame guesses as to the original type. That they exist there we are compelled to assume, but the primitive characters have been obscured in the differentiating process.

It will be thus perceived that the differentiating process has been by no means uniform in its results, and we will now proceed to look a little more closely into its working.

ON THE DETERMINING CAUSES OF THE IRREGULAR RATE OF THE DIFFERENTIATION OF PRIMITIVE PLANT-TYPES.

It is assumed that the differentiation of plant-forms is a response to the secular differentiation of the conditions of existence, beginning with a time when uniform conditions and undifferentiated types prevailed. This, however, will be discussed when we deal with the physical side of the theory. Here we are especially concerned with the unequal rate of the change.

It would not be possible to frame a scale connecting the degree of differentiation of a family with its relative antiquity, for the sufficient reason that there is no indication of any uniformity in the rate of the process. As far as the geological record can at present guide us, we seem to be justified in assuming an equally great antiquity for all primitive phanerogamous types. But how great is the contrast in the

* The Zingiberaceæ are mainly Old World, the Cannaceæ and Marantaceæ are mainly American, whilst the Musaceæ are fairly well shared between the two hemispheres.

results of the differentiating change! We can scarcely doubt that the primitive aquatic family type of Naias, during its differentiation into 32 species now spread over the world, has witnessed the development from the primitive type of the Compositæ of its 13 tribes, of its 730 genera, and of its 10,000* and odd species that now between them occupy the land-surface of the globe. Other primitive family types have, however, during this period disappeared in the differentiating process, being only recognisable now in the common characters of a group of closely related families that occupy between them the area of the original family. Amongst such buried primitive families we have mentioned the Scitamineæ. In other cases, again, even the connections between the secondary families have disappeared, and we get solitary families restricted to particular regions and standing aloof from nearly all their kind. Of such families, that of the Pandanaceæ has already been cited as an instance.

What, we may now ask, is the explanation of this unequal rate of the differentiating process in the plant-world? The determining causes are to be found primarily in the lack of uniformity in the differentiation of the life-conditions, and secondarily in the lack of uniformity in the operations of the dispersing agencies.

(1) *The lack of uniformity in the differentiation of the life-conditions.*—Since that ancient period when similar conditions of existence occurred over most of the earth and swamps prevailed, the primitive life-conditions have been broken up to a much greater extent for some kinds of plants than for others. Thus, whilst the aquatic habit comes nearest to the primeval condition, the terrestrial habit has differentiated in a thousand ways on account of the great diversification of modes of life and the resulting large number of possible combinations of all that goes to determine the conditions for plant-life on the land. Aquatic plants might therefore be expected to have changed much less rapidly than land plants; and the more complete the submergence, the slower would have been the change. Very few, if any, of the families containing only aquatic or subaquatic plants possess as many as 100 described species. In most cases the number falls far short of this, Naiadaceæ

* A generation (33 years) has passed away since the publication of Mr. Bentham's monograph on this family, when the described species were placed at about 9,400. The number must have been considerably increased since that date.

having 32 and Sparganiaceæ only 15; while Alismaceæ and Potameæ each possess about 70. On the other hand the species of many land genera amount to hundreds, and those of the families not infrequently mount to thousands. The vast family of the Rubiaceæ contains genera like *Psychotria* that comprise between 600 and 700 described species. Those of the Compositæ number about 10,000; whilst those of the Leguminosæ, Labiatæ, and Gramineæ run also into thousands. However, taking the small families with the large, we should be well within the mark if we assumed that for every aquatic species ten land species have been developed, or, in other words, that the differentiation has been ten times as rapid among land plants. From a rough computation I should imagine that the average number of species in a land family would not be less than 600 and in an aquatic family not more than 40, so that the assumption errs on the safe side.

Although the family type represented in the aquatic genus *Naias* must be very ancient, it can scarcely be said to have advanced beyond the first stage of differentiation.* The tardy differentiation of aquatic plants is primarily due to the slow response of their conditions of existence to the secular differentiation of the earth's climate; but this retarding influence has been intensified by their freedom of dispersal through the agency of waterfowl. This brings me to the second cause of the unequal rate of differentiation over the world.

(2) *The lack of uniformity in the operations of the dispersing agencies.*—Although this cause is the least important of the two, it is necessary to discuss it because the standpoint adopted may not be familiar to all. It is well known that isolation favours differentiation, and, since all means of dispersal tend to retard this process, it follows that the agents which, like the winds and currents, have been most uniform in their operation in space and time will, as a rule, have been most effective in retarding change, whilst those which have been irregular in their action, as in the case of birds, will have been less effective in checking the process. This difference, however, is one of degree and not of kind, since all nature has responded to the secular differentiation of climate and to the diversification of the surface conditions, the winds, the currents, and birds alike, but organized beings most of all.

* "*Naias* forms a distinct and apparently primitive type of Monocotyledon" (Rendle in the monograph on the Naiadaceæ, *Das Pflanzenreich*, iv, 12, 1901).

As illustrating the results of the different agencies of dispersal in the same region, I will take the case of the Tahitian group in the mid-Pacific, making use of the data given in my book on *Plant-Dispersal*. The observations of Dr. Treub and of Prof. Penzig on the stocking of Krakatoa with its plants justify us in assuming that the agency of wind in mid-ocean would be almost entirely confined to the transport of the spores of cryptogams. On the other hand the observations of many observers have shown that the agency of birds is restricted mainly to the inland flowering plants and the agency of currents to the shore plants. The effect of these agencies on the differentiating process of the plants concerned is of course displayed in the degree of endemism, or in other words, in the proportion of peculiar species. It thus appears, as is clearly indicated in the case of the Tahitian Islands in the accompanying table, that the differentiating process has been much more retarded where either the winds or the currents have been the agents of dispersal than where the birds have been the agents. Among the shore-plants, which are mainly dispersed by the currents, only 1 or 2 per cent. of the species are peculiar, and amongst the wind-dispersed ferns and lycopods 8 per cent. are peculiar, whilst amongst the inland flowering plants as many as 43 per cent. are confined to the group. In the Hawaiian Islands, where the isolation has been markedly greater than with the Tahitian group, 80 per cent. of the flowering plants and 45 per cent. of the vascular cryptogams (ferns and lycopods) are peculiar, the true littoral flora being very scanty, owing to the position of the islands with regard to the currents.

Table illustrating the relation between the proportion of peculiar species in the Tahitian flora and the mode of dispersal.

Station and Character.	Prevailing mode of dispersal.	Total number of species.	Proportion of peculiar species.
Coast flowering plants	Currents ...	55-60	1 or 2 per cent.
Ferns and lycopods ...	Winds ...	154	8 per cent.
Inland flowering plants	Birds ...	260	43 per cent.

Now we have no reason to assume that the winds are less effective in carrying the spores of ferns and lycopods than they were in the earliest epoch of the floral history of the Pacific islands. On the other hand, with the flowering plants, which depend almost entirely on birds for their dispersal, the operations of the dispersing agencies over this ocean have been, as I have shown in my book, always irregular, and are now for the most part suspended, the results displaying themselves in the far greater number of peculiar species. In the case of Hawaii the contrast between the endemism of the flowering plants and of the vascular cryptogams is indeed much greater than is indicated by the proportions of peculiar species, since its flora contains nearly thirty peculiar genera of flowering plants against only one or two amongst the ferns and lycopods. However, these islands of the Pacific only illustrate operations of far greater antiquity in continental areas; but with the insular floras we are better able to compare the effectiveness of the dispersing agencies and to eliminate many of the disturbing factors of continental floras.

In continental regions the bird has been only one of several agents that keep the different areas in touch with each other by transporting seeds. But in the stocking of the isolated archipelagoes of the Pacific the influence of birds has been predominant. However, seed-dispersal over that ocean is now practically suspended, and the birds that once carried seeds from group to group, having long since ceased to wander, are now represented by distinct species in the several archipelagoes. The plants once dispersed by them have responded to the change and have differentiated in the various groups, so that strange inland plants and strange forest birds go together in the Pacific islands. The nature of the connection between freedom of dispersal and specific differentiation was well brought out in the collections made by Beccari in Borneo.* Thus he found that whilst 30 per cent. of the numerous species of *Ficus* were peculiar, as many as 85 per cent. of the palms had not been found elsewhere, the explanation lying in the "facile dissemination" of the species of *Ficus* by birds as compared with the palms.

Whilst plants as a whole have responded through the run of the ages to the differentiation of climate, in the case of those possessing edible fruits the bird has largely determined the rate of the change. With the secular drying of the globe the

* See the author's book on *Plant-Dispersal*, p. 504.

changes of climate, bird, and plant have often gone on together, the range of the bird being controlled by the climate and the distribution of the plant being largely dependent on the bird. The bird generalised in type that once ranged the globe is now represented over its original area by a hundred different groups of descendants, each confined to its own locality. Climate, once so uniform, now so diversified, has by restricting the range of the bird favoured the process of differentiation, whilst those plants that are dependent on the birds for their distribution have in their turn responded to the changes. It is not possible to deal farther with this subject here, but much will be found on these subjects in my book on *Plant-Dispersal*, especially in the last two chapters.

THE TRUE FUNCTION OF THE AGENCIES OF DISPERSAL.

Regarding the study of plant-distribution as being almost entirely concerned with continents, since islands cover a very small proportion of the area of the globe, I am strongly inclined to the view that the function of the dispersing agencies has been chiefly limited to irregularly impeding the process of differentiation that is itself primarily determined by the secular changes in the climatic and surface conditions of the earth. If the diversification of forms depended only on physical conditions the earth's floras would be full of monotony. Variety begins when the agencies of dispersal interfere. Though naturally efficacious in stocking islands with their plants, the dispersing agencies acquire quite a different significance in continental regions. We are there brought face to face with problems concerned with station in its most comprehensive sense, with past changes in the history of climate and in the arrangement of land and sea, and with those mysterious revolutions in plant-forms that have affected the whole world. We cannot appeal to the dispersing agencies for an explanation of the distribution of the great primitive families, such as the Amentiferæ, the Aracæ, the Coniferæ, the Palmacæ, and the Scitamineæ, that now in different latitudes encircle the globe. Nor could they aid us in the case of a genus like *Acer* that goes back to the Secondary epoch and existed, as already shown, in early Tertiary times on both sides of the Atlantic.

The distribution of so many families in both the Old and the New World, whether in tropical or in temperate latitudes, would of itself suggest to us that in investigating means of dispersal

we only touch the fringe of a great problem. The view that such investigations go a very little way towards explaining the facts of general distribution is in accord with the view elaborated in my book that nature has made no especial provision for seed-dispersal. The instability in the past as well as in the present of the fruit as compared with the flower, and its relative unfitness for purposes of classification, are facts which point in the same direction. If we accept the principle of the differentiation *in situ* of universally distributed types in response to the secular differentiation of their life-conditions, we see at once the accidental character of the working of the dispersing agencies.

THE THEORY OF DIFFERENTIATION BRIEFLY STATED.

The hypothesis is one that connects the differentiation of plant-types over the earth with the secular differentiation of the life-conditions. With the creation of these types we are not concerned, since we are only witnesses of the processes connected with their diversification. Although this view is advanced in the preface and final chapter of my book on *Plant-Dispersal*, a work dealing mainly with insular floras, I had not then sufficiently grasped the idea that whilst the study of means of dispersal explains much in the case of floras of oceanic islands, it goes a very little way towards solving the great problems connected with continental floras. Only the later phases in the history of plant-distribution are illustrated in the islands. Principles of great weight in the stocking of oceanic islands shrink considerably in their importance when we apply them to the plant-distribution of the globe.

Now what, we may ask, is the significance of a differentiating world? This process has been at work on our globe from the beginning, and its operations are to be observed alike in the infinitely great and in the infinitely small. In those first ages when dense envelopes of mist and cloud screened off the direct rays of the sun from the earth's surface, when the air was ever saturated with aqueous vapour, and when the life-conditions were uniform over the globe, the same generalised plant-types were distributed over the earth. Then ensued a process of desiccation which is still in operation, and it is with a world that has for ages been drying up that the significance of differentiation lies.

The origin of the tribes is to be connected with the earlier stages of the process, those, for instance, concerned with the

emergence of the continents and the first development of climates. With the further differentiation of the life-conditions within the tribal area is to be associated the birth of the genus; and in response to the further specialisation within the generic area of the conditions of existence arose the species. In the plant-world the process of change has ever been from the general to the special, the family becomes specialised in its tribes, the tribe in its genera and the genera in its species. With each step in the differentiation scale, the geographical range would become more and more contracted, until whilst a family occupied a continent or ranged the world a species would be usually restricted to a very limited area. This is a theory somewhat idealised, but nature has ever been best symbolised by broad ideas. The dispersing agencies, for instance, would tend to blur the outlines, but the main features of distribution would remain unchanged. What explanation, I would ask, that assumes only a single centre of development could explain the behaviour of families distributed in both the Old and the New World? Here we find, as I have before remarked, that whilst most of the tribes occur in both hemispheres, most of the genera, and almost all of the species, are restricted either to one or the other.

The theory here advocated is concerned only with the normal differentiation of primitive types in response to the secular differentiation of the physical life conditions. It does not concern itself directly either with the abnormal plant-forms that have arisen under exceptional conditions of isolation as on oceanic islands, or with the floral modifications and monstrosities that have been developed in later ages through the establishment of a close biological relation with insects, birds and other creatures, but it holds that we ought in all cases to be able to penetrate the disguise. Such forms have not been produced on the lines of development which begin with the differentiation of a primitive family type and represent the response of the plant-world through the ages to the differentiation of the physical world. They are essentially distinct, and the generic value cannot possibly be the same for genera of such different histories.

GENERAL APPLICATION OF THE THEORY OF DIFFERENTIATION.

I will conclude the first part of this paper with a few general reflections. In the first place I would say that if we are not too curious about beginnings the theory of differentiation

should appeal to the idealist. Plants do not stand alone in its application. The same great process of change from the simple to the complex may be witnessed alike in the history of the cosmos, in the development of a world, in the diversification of its life conditions, and in the infinite variety of its organisms. We see its workings not only in the plant and in the animal, but even for man we can postulate a universally distributed generalised type from which the principal races have originated for the most part in the regions now serving as their homes. The early history of man is the history of a widely spread primitive human type differentiating *in situ*. I do not believe that if such a position were adopted for the apes it could be seriously objected to. No one, I imagine, would think it worth while to look for their home in any one locality, since like the palms they are distributed around the warm regions of the globe with the breadths of oceans dividing them. Like the palms also they had a wider distribution in Tertiary times, when they extended far into north temperate latitudes. One may say of the apes as Prof. Huxley remarked of the Gentians after vainly searching for their home "It is clear that migration helps us nothing as between the Old World and America. It is the case of the tapirs (Andean and Sino-Malayan) over again." We may indeed add that with man's distribution it is the case of the apes over again. How else can be explained the circumstance that in point of culture man has differentiated on the same lines during his earliest stages *all over the globe*, and that independent lines have been followed only in the later stages.

But the principle of differentiation affects us in a yet more extended sense. Our customs, our amusements, our sciences and even our creeds come under its sway. The differentiation of a creed follows the same law that determines the differentiation of a plant type. It is the birth of a creed that lies outside the law just as type-creation lies beyond our field of observation. All indeed who exercise the creative art, the discoverer of a new ideal, the inventor of a new machine, stand to that extent outside the law of differentiation. Difference in itself is not progress. Its end is extinction. Yet the simplest creative act can set the law at defiance. The progress of a nation, of a science, of a creed, lies not in differentiation or in specialisation, but in the genius of its great men. In the case of human effort we may call it what we like, genius, inspiration, or intuition. Yet man is only his Creator's instrument by which in the ages to come He will reshape the world.

PART II.

ON SOME OF THE EVIDENCE BEARING ON THE THEORY OF
DIFFERENTIATION.

The second part of this paper is devoted to a further discussion of the testimony favouring the differentiation hypothesis. The principle of the concurrent differentiation of plants and their life-conditions is either tacitly assumed or directly implied in the writings of several botanists. Of many again it may be said that whilst "evolution" is always on their banner, "differentiation" is ever on their lips. Indeed it is not easy to take up a book dealing with the development or with the distribution of plants and animals without discovering some pregnant sentence connected with this theory. There are others who state the theory both on its physical and its biological side so aptly and concisely that one wonders how they did not see their limitations and accept it as a good working hypothesis. Their difficulty, however, lay in the fact that differentiation acts only within the type, and that if we wish to discover the progressive development of types we must look elsewhere for the causes. The position adopted in this paper is that these causes are hidden from us, and that the only operations evident to us in nature are those concerned with diversification of already existing types.

The theory here advocated is two-sided. On the one hand there are the differentiating life-conditions which mainly find expression in the diversification of climate, and on the other hand there are the differentiating organisms. The connection between the organism and its conditions is implied in the prevailing views of adaptation apart from any particular theory, and I need not labour that point. The subject then has its physical and its biological side, and although we are here immediately concerned with plants, it should not be forgotten that if the hypothesis is a workable one it will apply also to animals.

The Physical side of the Differentiation Theory.

Little can be said here of the earliest stage of the conditions of life on the earth, an age when uniformity of conditions prevailed, an era, indeed, of Cimmerian gloom, when the sun's rays were screened off by dense envelopes of cloud and mist, and when the air was ever heavy with aqueous vapour. It is

the story of Genesis, and whilst seer and bard in all ages have made it their theme the man of science has not been able to disprove it. We may differ as to the details connected with the emergence and building up of the continents; but geologists seem generally agreed that in the process of time the land surface has become less insular and more continental (Sir A. Geikie, in *Encycl. Brit.*, xxviii, 635), that indeed the continents originated as islands, which have become united through successive movements of emergence, or, to put it briefly, that the continents have grown with the ages. We remember how Suess and other geologists emphasise the view that the great land-masses possess in each case a region which, since palæozoic times, has never been submerged and has served as the nucleus for the growth of each continent.

We get on somewhat firmer ground when we come to the differentiation of the life-conditions that finds its expression chiefly in the diversification of climate. With the cooling of the earth and the emergence of the land the uniformity of life-conditions began to pass away, and climates as such commenced to develop. There is, however, an important preliminary consideration to be borne in mind. Climatic changes during the secular cooling of the earth would assume a double character. There would be the general alterations affecting the whole globe, and there would be the more localised changes marking climatic differentiation. The first would be concerned with the general lowering of temperature, the decrease in humidity, the increased influence of the sun's rays, and the development of the seasons. The second would be concerned with the climatic characteristics of each region or locality. Whilst the earth's climate has, generally speaking, been getting cooler, drier and more sunny, it has also become infinitely more diversified.

Now in the response made by plants to the changes of climate, or to the conditions of existence determined by them, we ought to be able to distinguish two corresponding sets of effects, one characterising plants in general, and corresponding to the secular change of climate over all the earth, the other concerned with localised associations of plants, and connected with the diversification of climates in individual regions. Such effects would have nothing to do with the development of the great classes of plants. The moss, the fern, and the flowering plant would in each case display in its characters the double impress.

The response to the *general change in the earth's climatic conditions* would be denoted by some change that plants of all

the great groups have undergone. Here, for instance, might be placed the genesis of the rest-period of the seed, which would then be regarded as an adaptation to seasonal variation, or in other words, as a result of the development of the seasons (see chapter xxxi of my book on *Plant-Dispersal*). Here also might belong the transition from the dehiscent to the indehiscent seed-vessel or spore-case, which, as observed by Professor F. W. Oliver (address Botan. Sect. Brit. Assoc., 1906), is to be found in every group of plants, whether of cryptogams or of phanerogams. Behind the interesting fact that the capsule is older than the berry may lie many chapters in the climatic history of our globe.

The response to the *diversification of climate*, or to the conditions determined by it, would be found in the successive differentiation of tribes, genera, and species, the tribes reflecting the first great changes influencing large portions of the globe, the genera corresponding to subsequent changes affecting considerable sections of the tribal areas, and the species to still later changes affecting limited localities within the generic areas. Every plant thus bears within it the double impress of the changes in climatic conditions, or in other words, two sets of characters, one very ancient, which it possesses in common with all other plants, the result of such general changes as the lowering of the earth's temperature, the decrease of humidity, the increase of light, and the development of the seasons, the other, more recent, which it shares with a relatively small number of plants belonging to its own association, the immediate result of locality. It may be that the floral organs have mainly responded to the secular changes of climate that affected the whole globe, whilst the vegetative organs chiefly reflect the influence of the localised or differentiating climatic changes.

It will be sufficient now to refer briefly to the general desiccation of the globe, one of the most conspicuous in the secular alterations of climate that have influenced plant-development, reserving the diversification of climate for consideration with the differentiation of floras with which it is so intimately connected.

The desiccation of the globe.—The conception of a desiccating world is by no means novel amongst men of science. We find it most recently alluded to in the pages of Suess,* where we learn that during the seventeenth and eighteenth centuries it was held by philosophers and naturalists, more particularly by

* *Das Antlitz der Erde* French edition, tome ii, chap. i.

De Maillet and Celsius. Some of the wildest guesses of De Maillet have been perilously approached by modern philosophers.* For him all organisms were originally marine, their further development proceeding as the land emerged through the lowering of the sea level by evaporation. Although such a view may appear antiquated and absurd, the doctrine implied need not be condemned because we disapprove of the explanation of the lowering of the sea. It will appear later on in this paper, that as regards the origin of the vegetation of the earliest land surface, the principle there involved is an accepted doctrine of to-day. In recent years "the theory of desiccation," as it is termed by Suess, figures conspicuously in the story of the end of the world by Flammarion, the distinguished French astronomer.† For that brilliant writer, this planet is essentially a desiccating world. As the primitive heat is lost in space, the waters penetrate farther and farther into the earth's mass, being locked up in various combinations (chemical and mechanical), and the world dries up.

Evidence of the progressive desiccation of the earth during and since Tertiary times is displayed in all the large continental areas. We find its later effects in the desert areas of Asia, Africa, the two Americas, and Australia. Prince Krapotkin has advocated the view that in recent geological times, and indeed down to our own day, the earth has been passing through an age of desiccation. He points to Asia‡ as a continent that has long been drying up. As indicated by the evidence of its sea borders, it is experiencing, he says, a rapid movement of emergence; whilst the great lake systems that once occupied its interior have mainly disappeared. One can learn much from the pages devoted by Suess to the origin of Lake Baikal, of the numberless fresh-water lakes that in Tertiary times covered a greater part of northern Asia, but have now dried up, and we can read there also of the more ancient seas whose place they occupied. A large part of the Tertiary deposits of the world are lacustrine. 'The Tertiary has even been called the

* In the pages devoted to De Maillet by Quatrefages in his book *Charles Darwin et ses précurseurs français* (chap. i, 1870), we find that he held, but in another shape, the view implied in the now familiar sentence, "the moss-grown fragments from the ruins of another world."

† *La Fin du Monde*, Paris, 1894.

‡ *Geographical Journal*, February and March, 1904; see also his articles on Russia, Siberia, Turkestan, Volga, etc., in *Encyclopædia Britannica*.

age of lakes."* Yet, as in Asia, these beds must have originally been laid down on the deposits of earlier seas.

Those who have read Professor Gregory's recent interesting book, *The Dead Heart of Australia*, will remember that, when alluding on pages 153-4 to Prince Krapotkin's view of a general desiccation, he does not commit himself to an opinion for or against it; but only observes that a period of universal desiccation is not needed to explain the shrinking of Lake Eyre. Anyone who cares to go farther into this matter will find an abundance of data to elaborate; but it may be at once remarked that it is nothing to the point to urge that there has been no marked alteration in climate during the last two or three thousand years in vegetated regions long familiar to us, such as in South Europe. What we have to learn is whether the desiccating centres, that is to say, the desert areas, have been increasing in historic times. If the answer depended on the data supplied by the Asiatic continent, it would be certainly affirmative.

On the tropical sea-borders of a continent such a progressive desiccation would be indicated by the retreat of the mangroves towards the equator. In fact, if the process is still general, there would be a continuous shrinking of the areas held by mangrove swamps in warm regions. In Chapter xxxii of my work on *Plant-Dispersal* I have given reasons for the belief that the mangroves of the west coast of South America are retreating towards the equator owing to the advance northward of the arid climatic conditions of the Peruvian sea-border.† There are also some grounds for thinking that within historic times the typical mangroves have withdrawn in Western Asia from the Persian Gulf to the mouth of the Indus.‡

The Biological Side of the Differentiation Theory.

That, with climate as with plants, the line of the development has been from the general to the special, is a doctrine, I imagine, which has been commonly accepted. The principle of the differentiation of floras in the course of geological periods has

* *Geology*, by Chamberlin and Salisbury, iii, 193.

† According to Sir Martin Conway, as quoted by Prof. Gregory, the progressive desiccation of the southern part of South America is indicated by dwindling glaciers, disappearing lakes, and by the transformation of cultivated areas into regions of aridity.

‡ See a note in *Geographical Journal* for September, 1903, on a work by Dr. Bretzl dealing with the plants referred to in the account given by Theophrastus of Alexander the Great's expedition to India.

been received by most botanists, and by many its connection with physical causes has been either tacitly assumed or directly implied. The differentiation of the plant and of its conditions have ever gone on together. As indicating the general position, I will here quote from the address of Professor F. W. Oliver to the Botanical Section at the last meeting of the British Association. . . . "It is generally conceded (he said) that the primitive vegetation arose in the waters, and that with the parting of the waters and the emerging of land and continents this primitive stock of plants was sufficiently plastic to take advantage of the new conditions, throwing up successive hordes which affected a footing on the land, and in time peopled the whole earth with forms adapted to the varying habitats and climates as they differentiated."

Nature would thus seem all attuned, but there is a rift within the lute and a jarring note strikes on our ears. The sudden appearance of the Angiosperms in the Lower Cretaceous period without a warning note interrupts the harmony of nature's processes. We can, it is true, detect the same principles at work both before and since the Chalk, yet the break remains. But little can be said here of the indications of Palæozoic times, though as far as my data go, they seem clear enough. It appears to be generally recognised that during the early part of the Carboniferous epoch uniformity of climate and of vegetation prevailed over the world.* With the Coal Measures, to employ the words of Dr. Scott, "a differentiation of floral regions began," and we find at the close of the Palæozoic eras, that the world's plants, though everywhere constituting, as Mr. Newell Arber observes, another great epoch in the history of the vegetable kingdom, had grouped themselves into two great floras, the Northern and the Southern.

It was not, however, until after the sudden appearance of the Angiosperms in the Lower Cretaceous period that the ages of world-wide floras began to pass away, and plants came to be "distributed more markedly according to geographical provinces and in climatic zones." Through the Tertiary period the process of differentiation of floras was continued; and accordingly we find that the farther we go back in that period from the

* See the article on Palæobotany in vol. 31, *Encycl. Brit.*, p. 421 (Dr. Scott) and p. 422 (Mr. Seward); also Mr. Seward's address (*Brit. Assoc.* 1903); also Prof. Hull's *Coalfields of Great Britain*, 5th edition, 1905; also Mr. Newell Arber's *Catalogue of the Fossil Plants of the Glossopteris Flora in the British Museum*, 1905

present time the greater is the similarity between the widely removed and now dissimilar floras of North America, Europe, and Australia. (I have here quoted Mr. Reid's article on Tertiary floras in volume 31 of the *Encyclopædia Britannica*.)

The extension of tropical plant-forms far north into the temperate latitudes during early Tertiary times is well known, and Saporta long since placed the northern limit of tropical vegetation in the Eocene age at 55° N. These plants retreated towards the equator as the development of climatic zones proceeded, and many of them yet exist in a generic sense within the tropics. Temperate genera like *Acer*, that flourished in early Tertiary times in Arctic latitudes, followed in the rear of the tropical genera in their withdrawal towards the south. The shifting area of this genus in geological time is clearly elucidated by Pax in his recent monograph on the *Aceraceæ* (*Das Pflanzenreich*, iv, 163). Speaking generally, during the earlier and middle Tertiary times this genus extended in the northern hemisphere from far within the Arctic Circle to the 40th parallel of latitude, and perhaps farther south. As the ages passed away it abandoned the Arctic latitudes and advanced to within the tropics, so that its average range at the present time is confined between the parallels of 20° and 60° N., although individual sections have indeed penetrated farther south into Malaya, reaching Sumatra and Java. Of the earlier history of *Acer* we apparently know but little; but the facts, scanty as they are, are very suggestive. Among the fruits found by Mr. Newberry* in the Amboy clays of New Jersey, the equivalent of the White Chalk of England, were those of a species of *Acer* "quite unmistakable" in character. They were associated in this locality, which is situated near the 40th parallel, not only with the remains of several genera, such as *Populus* and *Quercus*, that are now mostly confined to temperate latitudes, but with many others, such as *Cinnamomum*, *Ficus* and *Myrsine*, that are now mainly restricted to tropical regions. The pre-Tertiary history of *Acer* would thus seem to belong to an age when the distinction between tropical and temperate floras had not been established.

It is the occurrence of these "mixed" angiospermous floras during Cretaceous and Eocene times in extra-tropical regions

* U.S. Geolog. Survey, *Flora of the Amboy Clays*, by J. S. Newberry, 1895.

that is especially discussed by Chamberlin and Salisbury in their recent great work on Geology. Whatever may be the opinions of these two American authors concerning the occurrence of a universal warm climate during the early geological periods, a notion that they reject altogether, they hold no uncertain views relating to the differentiation of climates and floras in later ages. The same mixed flora, in which plants now confined to separate tropical and temperate regions were associated, extended, as they remark, in Upper Cretaceous times in Europe and North America over thirty-five degrees of latitude, reaching as far north as Greenland. Such a flora, they suggest, would imply "climates of a less differentiated or less diversified nature." These mixed or undifferentiated floras also occurred in the Eocene, and the authors lay stress more than once on the association in the deposits of this age of palms and poplars. "Probably the true view," they write, "is that the mixed or undifferentiated flora of the Cretaceous and Eocene, when it came to be subjected later to severe climatic and other crucial conditions, became modified into adaptive groups, some of which came to be restricted to the tropical regions and are now known as tropical plants, others to the temperate, and still others to the boreal regions, acquiring corresponding designations." In another place they term this process "adaptive differentiation" (vol. iii, pp. 226-7).

The process of the dissociation of the mixed floras extended, as they observe, into the Miocene, when occurred "the gradual removal to the south of the forms now regarded as tropical or subtropical, and the concentration at the north of the forms that now characterise those latitudes." Here they are undecided as to whether this was the result of "natural differentiation and segregation of the previously mixed forms" or of "a progressive differentiation of climate" (vol. iii, p. 283). However, they leave us no longer in doubt in the matter when writing of the continued dissociation of the mixed floras in the succeeding Pliocene period. "The Pliocene (they observe) was characterised by a still further sorting out of the mixed flora of previous periods and by the southerly migration of what are now tropical and sub-tropical plants." The evidence, as they proceed to show, indicates not only "a general differentiation" of plants but also that "the climate was becoming differentiated, and on the whole cooler than it had been in earlier Tertiary periods" (vol. iii, pp. 320-1).

And now, in conclusion, I think I may claim to have shown that, as far as the cited opinions indicate, the differentiation

theory presents us with a good working hypothesis, at least for the age of the Angiosperms which began in the Upper Cretaceous epoch. Beyond yawns a gap between the present and the ancient order of vegetation. It has not been bridged over, and seems unfathomable. "Whence came the Angiosperms?" is the question that students of past floras are ever putting to themselves. Did they come across the gap? To this at present there is no reply. "We are profoundly ignorant," says Mr. Seward, "of the means by which nature produced this new creation" (Brit. Assoc. Address, 1903).

DISCUSSION.

The SECRETARY (Professor HULL, F.R.S.), in moving a vote of thanks to Dr. Guppy—who was unable to be present in consequence of being detained in Jamaica—considered the paper as one of unusual interest from the point of view of a naturalist. It gave us in a condensed form the results of observations carried out in various countries, and treated at large in the author's most recent work, *Observations of a Naturalist in the Pacific*, vol. ii,* dealing with the subject of "Plant-Dispersal." This is a highly complicated subject, involving as it does not only the agencies by which dispersal of the seeds and spores of plants is effected, but the changes in the distribution of land and sea, owing to which lands once connected have become separated and isolated, by which climates have been altered, and by which differentiation of genera and species has been advanced. I think it must be admitted that Dr. Guppy has made out a very strong case in favour of his theory that an original wide-spread parent-form of a plant has, owing to physical changes, become disunited into separated areas, in which differentiation has progressed, resulting in the production of fresh genera and species; nor is it improbable that this process may in some cases have resulted in the production of identical genera and species, rising from independent originals or tribes. How otherwise can it be explained that 13 per cent. of the genera and 41 per cent. of the species belonging to 24 families are common to the Old and New Worlds which have

* Macmillan and Co., 1906. The volume has been presented by the Secretary to the Library of the Institute.

been physically disconnected by the ocean for several geological ages, certainly since the Cretaceous period?*

Dr. Guppy closes his paper by asking the question, "Whence came the Angiosperms which appear with the Upper Cretaceous period with such startling suddenness?" Down throughout the Mesozoic ages, the flora of the world was (as far as our knowledge extends) restricted to Conifers, Cycads, Ferns, and Equisetums—a gloomy and flowerless vegetation. Hitherto no examples of dicotyledonous plants had appeared, but with the Upper Cretaceous period a change in the flora took place so remarkable that Prof. Oswald Herr characterises it as "a new fundamental conception" introduced into the Vegetable Kingdom. It reminds one of the change which took place over Western Europe in architecture when the light and graceful "Early English" style replaced the massive and heavy "Anglo-Norman." To this change we are indebted for our forest trees, the oak, the walnut, the willow, the poplar, the plane, the hornbeam, the liriodendron, the fig, magnolia, the myrtle, and the eucalyptus. Later on in early Tertiary times, fruit trees and flowering plants established their range, supplying us with food and decorating our hills and valleys. As the period for man's abode on earth approached, nature, under a guiding Providence, furnished and decorated his dwelling place. To the question above stated, Dr. Guppy gives no reply. It is so far an unsolved problem, which the geologist would try to answer by stating that the gap in time between the Lower and Upper Cretaceous was so immense that by a process of evolution the change resulted; but a botanist of eminence, Mr. Seaward, in his address to the British Association, states, "We are profoundly ignorant of the means by which nature produced this new creation."† The reply which refers all such facts to "the imperfection of the geological record," has been characterised by an eminent man of science as "the inflated cushion on which you try to bolster up the defects of your hypothesis." Not a bad illustration!

Dr. R. P. COLLES.—In reply to your very courteous request

* In the Animal Kingdom the development of the horse both in America and Europasia gives us an example of the process of nature above referred to.

† *Brit. Assoc. Report*, 1903, p. 847.

that I should send you, in writing, the remarks I made after the reading of Mr. Guppy's paper on Plant-Distribution, I can only repeat my answer that they are not worth it, except, perhaps, as relating to the Chairman's opinion that the author had not given sufficient importance to human agency as one of the means employed in the distribution of plants.

Many years ago I was for some time at Landawur, in the Himalayas, where there is a military sanatorium about 7,000 feet above sea-level. The steep sides of the mountain were wooded, principally with evergreen oak, the branches of which were thickly fringed with ferns; there were also rhododendrons growing as high as elms, with dark red flowers. Here and there, on the lower slopes, were small pine woods of wonderful beauty, and, I may also add, full of leeches, with which one's feet became covered when climbing up or down the steep khud (precipice) on which they grew. There were single dahlias growing wild on the mountain side in the places where there were no trees, forming patches of brilliant colour—scarlet, sulphur, and white. It was supposed that they were indigenous to the soil, and people wondered at this, as the extremes of climate in the Himalayas and the want of moisture for many months would be against the growth of such a plant. But our innocent speculations were one day ruthlessly overturned by someone saying, that in a little graveyard on the side of the hill above us, one of the graves had, some time ago, been planted with dahlias and that they had spread freely, partly from seed and partly from the clearing out of rubbish and superfluous clay, probably containing fragments of dahlia roots which were thrown down the hillside from the graveyard. In this case human agency would account for the appearance of this flower, but it would be interesting to learn if it still exists in the same latitude, or if it has gradually died out, as it might well have done after the lapse of years since I saw it there in 1872.

Colonel T. H. HENDLEY, C.I.E. (CHAIRMAN).—Is enough stress laid upon the importance of human agency in the distribution of plants or in the changes in climate which affect it? For example is not the dessication of large tracts of country due, in some cases, to neglect to maintain canals and other irrigation work, as has been the case in Mesopotamia; or to somewhat similar causes, as in the Western parts of the Punjab and Rajputana; or in others to

diminution of the population from war or famine which has thrown land out of cultivation, as in Palestine.

Was not the decay of prosperous regions, owing to a change of climate, caused by wasteful destruction of forest, as well as those already cited, and has not land planted with vegetation, especially trees, led to increased rainfall and the introduction of new plants? Is not this the case in Egypt?

As to the dispersal, how are we to account for such cases as the appearance in India of large specimens of the *Adansonia digitata*, which is an important member of a genus confined to Africa and Australia (as Mr. Guppy says)? I have seen this magnificent tree, at one time thought to be the oldest tree in the world, in the ruins of Mandra, the famous capital on the Narbuda of the Sultans of Malwa, and it is found in other parts of India. Some believe it was introduced by the Portuguese only 300 years ago; others put back its introduction to a much earlier date.

In any case, is not too much importance attributed to time in these questions? If the Portuguese theory regarding the introduction of the Baobab into Western India is accepted, only 300 years are required for a wide dispersal. Of other cases we have more accurate knowledge. Most of the European garden vegetables now in use in India, we learn on the authority of the Physician Bernier, were first introduced into the country a few centuries ago.

The Emperor Baber has told us that before his time there was little fruit in the country, and it is certain that tobacco was unknown before the Moghul period, because the Emperor Jehangir, like so many other great Sovereigns of the time, threatened its use with death.

Instances such as these might be multiplied indefinitely, I think, in proof of the view that human agency is of immense importance in plant distribution.

Mr. MARTIN L. ROUSE.—The theory of the author of this learned paper is that every order or tribe was at the first created over a large proportion of the Earth's surface, and that, by the accidents of climate, exposure to wind or sun, elevation and character of soil, each split up into manifold genera and species more and more remote from one another over the vast region once covered by the original order or tribe. This agrees with the view of Linnæus, himself—whose reverent spirit none can impugn—for he thought that "Omnipotence created the orders, climate shaped

these into genera, while the accidents" aforesaid "discriminated the genera into species." Doctor Guppy establishes his theory by the following arguments:—

1st. That the genus or sub-genus which contains more than any other the characters of an order, and appears thus to be the parent of its other genera, is the very one which is most widely distributed (of which phenomenon he, however, only actually cites two examples).

2nd. That among 23 orders and sub-orders that have been examined we get a result in a descending scale such as the theory would lead us to expect—namely that 92 per cent. of the tribes, 11 per cent. of the genera, and only 1 per cent. of the species are common to the Old World and the New.

3rd. That since the conditions under which land plants live differ far more amongst themselves than those under which fresh-water plants exist, we should expect to find far more species of land orders than of fresh-water ones; and, as a fact, we find ten times as many of the former as of the latter.

4th. That where the agencies of dispersal (currents, winds, and birds) have their fullest play in maintaining original species, there the number of strange species found is smallest.

The case is very strong against the common theory of dispersal of genera from single centres, which other arguments of the author show to be untenable; but he does not overthrow the view that every genus, and perhaps every species, was originated in one or more of its present abodes. If the species and genera of each order are the result of differentiation, we should expect to see them forming hybrids between themselves; whereas even the species will not do this naturally—and to bring it about artificially is no easy task—all the proper stamens of the fruiting flower having first to be cut away, for if any of its own pollen be at hand its stigma will receive and assimilate this by preference and yield a flower like itself.* In an article written a year ago from Palestine to the *Gardeners' Chronicle*† by our fellow-member Mr. Arthur Sutton, he described the abundance and beauty of two plants that grow side by side in many parts of Palestine—the *Anemone coronaria* and the *Ranunculus Astaticus*. The form of the flowers is, he says, the same,

* Chambers's Encyclopædia, *Hybrids*.

† For April 28th, 1906.

and the prevailing colour of both is a deep red or scarlet; but the *Anemone*, like all its genus, is without a calyx, while the *Ranunculus*, of course, possesses one; and whereas the lovely shades of colour in the *Anemone*, varying from a pure white to deep mauve, found in comparatively few districts, are never seen in the *Ranunculus*, the rare tints of bronzy yellow, sometimes seen in the *Ranunculus* are never displayed in the *Anemone*—the plant that has no calyx never exchanging tints with the plant that has one. Again, the plant without a calyx always begins to bloom two or three weeks before the other. So there is no hybrid between *Anemone* and *Ranunculus*. And yet they have bloomed in company for ages and in all positions and climates of Palestine—on the low plain of Sharon near the sea, by the Lake of Galilee, 700 feet below sea-level (where tropical plants thrive), and on the slopes of Mount Carmel, 1,500 feet above sea-level (where hail and snow are frequent); which fact, as Mr. Sutton points out, ought, on the theory of evolution, to have wrought some lasting change of form in both plants: but there has been neither hybridizing nor differentiating whatever. Similarly, the few plants that have been found in Egyptian mummy coffins are identical with their present-day representatives; and in the parallel case of animals Mr. Sutton cites a work published by Messrs. Lortet and Gaillard, of Lyons, entitled *La Faune Momifiée de l'Ancienne Egypte*, which “shows clearly that the species embalmed 20, 30, or even 70 centuries ago have not changed in the least.”

Two instances alone are insufficient to support the author's first argument; one would like to know how many more he has in reserve.* And as regards his third argument, since the surface of actual land is far greater than that of lakes, rivers, and streams, and has been so ever since the creation of man, and since fresh-water plants can grow only along their borders or in their slower currents, we should expect to find a smaller variety of fresh-water plants than of land-plants in the world; and, as a fact, we have a smaller number of families and genera as well as of species of the former.

A cordial vote of thanks to the Author was then put from the Chair, and carried unanimously; the meeting then adjourned.

* Perhaps these may be found in his volume referred to by the Secretary.

ORDINARY GENERAL MEETING

WAS HELD IN THE ROOMS OF THE INSTITUTE, ON
MONDAY, APRIL 22ND, 1907.

LIEUT.-GENERAL SIR H. L. GEARY, K.C.B., IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed.

ELECTION :—William A. E. Ussher, Esq., F.G.S., was elected Associate.

The following paper was read by the Author :—

*EXPLORATION OF ASIA MINOR, AS BEARING ON
THE HISTORICAL TRUSTWORTHINESS OF THE
NEW TESTAMENT.* By Professor Sir WILLIAM M.
RAMSAY, D.C.L.

IN ancient history generally, and particularly in the department which forms the subject of this paper, the investigation of Biblical history, many of the greatest difficulties originate in our ignorance. Ignorance produces misconceptions, and from these misconceptions positive inferences are drawn with unbecoming and dangerous confidence; yet the whole structure of inference rests on absolutely no foundation. In nothing is the spirit of the true scholar and historian better shown than in the ability to know what premises are safe, as resting on positive knowledge, and what premises are mere prejudices having no support except ignorance.

I would for a moment call your attention to one example of this general principle, viz., the prejudice that the art of writing was late in origin, known in its early stages only to a small number of persons, and little used except for great and solemn religious or State purposes. This is a mere prejudice—perhaps one ought to say, it was a mere prejudice—only it still survives in practice, though no one now in theory would any longer

maintain it, and its consequences and the inferences founded on it still survive and are quoted and widely believed. The prejudice had no foundation except in the fact that such was the case in mediæval Europe, and it was assumed that what was the case in the Middle Ages must have been still more decidedly the case in ancient times. In other words, this prejudice rests on the preliminary assumption that there has been a continuous development in civilisation and knowledge since ancient times. That, again, is mere prejudice which deceives men by its pseudo-scientific character. We now all are devotees of the theory of development: it has ceased to be a theory and is made the basis and the formative principle in our mind and thoughts. Rightly or wrongly, we must have development everywhere, and in this case it is utterly wrongly, for in religion the human tendency is always towards degeneration, not towards development, and in civilisation there occurred the almost total destruction of the ancient knowledge and the ancient education.

There was, therefore, no ground for the practically universal assumption that writing was not familiarly used in ancient times for ordinary purposes of life. Yet this assumption was made the basis for arguments in literary history, and in particular for arguments against the early date of many old books, such as the books of Moses and of Homer. The preservation of books from the period to which these compositions were traditionally assigned was impossible without writing, and writing was either unknown or practised only in a very narrowly limited way at that period. This argument was, I confess, quite convincing to me when I was studying, under Robertson Smith's guidance before the year 1880, the Hebrew history. The reply to this argument equally assumed the false premise about the rarity of writing and merely pleaded that memory unaided by writing was quite fit for the composition and preservation of great literary works. This reply was hopelessly inadequate. There would be no difficulty in committing to memory the *Iliad*, for example; personally, I knew that I could easily do so, if there were anything great to gain thereby. But a vast deal more than mere memory is needed before the civilisation is formed in which such a literature can be composed and become a national possession, a power, a Bible. I mention this reply—the only reply then made—merely to show how universal in quite recent times that assumption about the ignorance, or at least extreme rarity, of knowledge of writing was. Homeric and Biblical criticism,

alike destructive and conservative criticism, was based on this false premise, and the consequences still remain to some extent in the criticism of all classes and schools. Ideas which, on being strictly tested, are found to be mere inferences from that assumption, are still prevalent and almost unquestioned. For example, how few would venture to maintain that the Synoptic Gospels are, or might be, based on documents, some written while Christ was still living, some within a few hours or days of his death? *i.e.*, there were such documents in existence, accessible to persons who desired to attain "to know the certainty of those things." I feel no doubt that this was the case, and in a book published more than two years ago I used the words "so far as antecedent probability goes, founded on the general character of preceding and contemporary society, the first Christian account of the circumstances connected with the death of Jesus must be presumed to have been written in the year when Jesus died." I fear that such a statement would find small support in general opinion, and yet it is simply the statement of the known facts, and, unless the followers of Christ had already cut themselves off from the habits and customs of contemporary society, it must be true. In the last few days I have printed an argument that about a sixth part of the Gospels of Matthew and Luke, which is common to them but is not found in the Gospel of Mark, is taken from a document written before the death of Christ. Such results as these, if they can be established, carry us far forward. A history which ultimately rests partly on contemporary written evidence, partly on the evidence of eye-witnesses and actors in the events, stands on the highest plane of historic certainty.

Can these results, then, be established, and how shall we set about the work of establishing them? They can be established only in the same way in which the early use of writing was made known to us.

That writing was used familiarly and commonly some thousands of years before Christ, that the whole practice of government and law at an early time was based on the rule that everything must be written down at the moment, *e.g.*, that all sales and conveyance of property must be registered in writing, —all this has been revealed in recent years, not on literary evidence, but by finding the actual documents. We know that people wrote at a very early time, because we have the things which they wrote, on stone, on bronze, on pottery, partly incised, partly written in ink. The use of ink is extremely important, because ink was not invented for use on materials of that kind,

but for use on more perishable material like paper, or skins, or parchment; and therefore ink-written pottery implies the use of those more perishable materials. But Egypt is the only country which is dry enough to preserve such materials; and there alone is ancient written paper found; but the wider use of ink furnishes the proof that similar perishable materials were used in other countries besides Egypt.

Mere literary arguments could furnish no revolutionary discovery like this: one can advance only by very short steps with that class of arguments; no great step can ever be taken safely on purely literary reasoning. And by the purely verbal reasoning which has been fashionable in the latter part of the nineteenth century, no real progress can be made. Verbal arguments may afford valuable suggestions, but they must be treated as mere hints and sign-posts, and they must be tested by other kinds of reasoning or by discovery before any trust can be placed in them.

The purely verbal scholars make much parade of their readiness to accept each new discovery as it is made; and for their readiness they deserve all praise. The criticism which one has to make on them is twofold. In the first place, they very quickly forget that any discovery was ever made. They cease to remember the last stage of literary and verbal reasoning as soon as the new basis is attained. In the second place, they are as perfectly confident in the new style of reasoning as they were in the old; and at the next epoch-making discovery they will toss aside their present basis of reasoning and adapt themselves with admirable versatility and absolute confidence to the new conditions; and at each stage they give no sign that their former views and methods were quite different, and that they are indebted to the discoverer of the actual ancient objects for the progress that they are making.

Now I will ask your attention to another example. When the careful and thorough exploration of Asia Minor began in recent times, it is safe to say that the book of the Acts of the Apostles was the most suspected and discredited book in the New Testament. Many even of the most conservative scholars had tacitly abandoned it to its fate: no one, so far as I know, among the leading scholars of any school or tone of thought, ventured to say a word in its favour. The many scholars who were hostile to the historical credibility of the New Testament considered the question with regard to the Acts as closed. No person who valued his reputation among scholars dared to reopen it, for the belief was unchallenged that no one who

deserved the name of scholar could entertain any doubt on the point or hesitate to acquiesce in the practically universal condemnation. The book of the Acts was condemned as a compilation made in the second century from older records; the book was declared, though founded on older sources, to be so interpolated and so strongly coloured as to distort the historical view and to impart an entirely false atmosphere and false suggestion to the facts, even when these facts were in part taken from older written authorities; and many people seemed even to hold that the supposed compiler of the book in the second century had actually invented some of the facts which he stated. The only approach to trustworthiness was where the compiler had failed to change his older written authority, and had left some scrap of earlier writing which could readily be distinguished from his own poor stuff.

The case is now altered. Some considerable parts of the book are now universally admitted to deserve perfect credence, and even to stand on the highest level of historical authority, as written either by a thoroughly well-informed person, or even by an educated eye-witness. At the very least, it is now allowed that most of the second half of the book can be accepted as entirely historical. The more conservative scholars do not now hesitate to champion the whole book as written by one who was an eye-witness or the intimate personal friend of eye-witnesses, a trusted and admiring follower and coadjutor and adviser of the Apostle Paul, and they do not hesitate to accept the book as being what the very old tradition declares it to be, the narrative written by St. Luke, the physician and evangelist. They regard it as being, as it purports to be, the second part of an historical work of which the Third Gospel is the first part: the intention and plan of either part of this great historical work is not to be gathered from itself alone. The entire work in its two parts must be studied together as a single whole; and it is even maintained by some, among whom the present speaker ventures to claim a place, that the work was unfinished. Now, a man who has the genius to conceive the plan of such a work as this, does not, and cannot, abandon it half-finished; he must work at it until he completes it, or until—he dies. If the work of Luke was left unfinished, the sole reason that can be thought of as possible, was his death—and, to all appearance, his premature and unexpected death. That such an event was quite probable, appears from the tone of the book. It looks out over a storm of persecution: it is written by a person who aims at defending Christianity by au

appeal to facts and by a simple narrative of history; its effectiveness depended on the undeniableness of all that it records; and it came to a sudden end, because the author was overwhelmed in the persecution while he was composing this eloquent and yet perfectly simple and unadorned history.

But however this may be, it is a mere matter of interpretation. The important point about which many scholars are now united, is that the book of the Acts, as we have it, was written by Luke. The recent work of Professor Harnack, entitled *Luke the Physician*, is an able argument on this side. The distinguished Berlin Professor, and King's Librarian, fully recognises the impossibility and utter failure of the theories of second-century origin for the book of the Acts: no one has condemned more strongly than he, the uselessness and inadequacy of those theories. He sees the unity of authorship and design throughout the two parts, Third Gospel and Acts; he proves in detail the identity of style throughout both parts, he demonstrates that the two are entirely, from beginning to end, the work of one writer, who impresses his own individuality on both parts; he accepts and summarises the arguments—or I should rather say, the marshalling of the facts, as made by Mr. Hobart, of Trinity College, Dublin—which show that the author of the Third Gospel and of the Acts was a physician, trained to observe medically, to take an interest in medical facts, and to use naturally the terms and language of medical science.

Further, Professor Harnack declares, as the result of a minute examination, that in a considerable part of the Third Gospel, where we possess the older authority which Luke used, the physician made no changes beyond those of a verbal and stylistic kind. He improved the Greek, but he left the facts as they were recorded by his authority; and he carefully and everywhere refrained from inserting anything savouring of the sentiment and thoughts of the later first century, when he was writing.

We can say with confidence that this was Luke's rule and practice, because we have in one case the text of the original authority on which Luke founded one-third of his Gospel, and in another case we can recover from the agreement of Luke and Matthew an outline of another original authority which they both employed, and on which they based about one-sixth of their respective Gospels. These are Professor Harnack's results in the detailed examination, clause by clause, and word by word, of a large part of Luke's Gospel. Such is the opinion that he expresses when he takes facts, weighs them accurately, and

finds his judgment on them. Since in every case where this writer's use of his written authorities can be tested, he is found to employ them carefully, and report them accurately, surely it would be quite justifiable to generalise the principle, that in other cases where we do not know the original words that Luke had before him, and worked up in his history, he presents an accurate report of their meaning, and that he does not interpolate thoughts and interpretations which belong to his own later period.

Accordingly, in estimating Luke's trustworthiness as an historian, we have to start from these results which Professor Harnack's minute examination furnishes, regarding about half of the Third Gospel. We have to bear in mind that he was for many years in close association with St. Paul, that he had come into personal relation with many of the persons to whom he alludes in the book of the Acts, that he had abundant opportunity of learning all his facts from eye-witnesses, that he was in many cases himself an eye-witness. Then in regard to his qualifications for writing the Gospel, we must take into account that he had travelled in Palestine as early as A.D. 57, and had met the leaders of the Church in Jerusalem, that he was two years in Cesarea in close relations with the Church there, that he had (as he tells us) opportunity of knowing the certainty of those things.

Such are the conditions on which you have to form an opinion as to the historical credibility of Luke now. Is there any historian of ancient time about whose authorities we are better instructed than we are about Luke's original sources of information? Is there any ancient historian who can furnish us with better credentials than these? Certainly, there is none.

In passing, I must for a moment allude to the singular contrast between the results attained by Professor Harnack about the facts of Luke's history, when he is dealing with facts, and the judgment which he expresses about Luke as an historian when he is stating opinions. He finds no words too strong to condemn the looseness, the inaccuracy, and the untrustworthiness of Luke. Luke was, he declares, unable to tell what he had himself seen without misrepresenting it. No authority attaches to his statements; he aimed at historical and literary effect, not at truth.

I find it impossible to reconcile Harnack with Harnack: his opinions in summing up disagree utterly with the facts as he determines them in collecting the evidence. Were I a "Higher Critic" of the fine old-fashioned nineteenth-century kind, I

should find abundant reason to conclude that the book on *Luke the Physician*, attributed to Professor Harnack by universal consent, is really the work of at least two writers, and that their works have been wrongly united into a single composite work by a later author, who took parts out of the two older writers, and combined them regardless of the hopeless and glaring disagreement between them. But I am not a "Higher Critic," merely a common-place historian, whose only aim is to establish facts, and to state the judgment that inevitably and simply springs from the facts. The contrast between facts and judgments in Harnack's recent work is not due to the combination of two authorities into one book; but to the firm resolve of the author to reject much of Luke's work as incredible, and to the necessity of preparing the way for this rejection by finding fault with the culprit.

Let us take one example of the inconsistency between the opinions of Harnack and the admitted facts. He admits, as the facts to start from, that Luke entered into Paul's circle, when Paul had been, and doubtless still was, publishing the Apostolic Decree of the Council of Jerusalem to all his Churches as their rule of conduct. Luke quotes this Decree verbatim, and tells us all about how it was passed and what use Paul made of it. Such are the facts admitted by Harnack; but his conclusion is that the Decree was a free invention of Luke's—mark you, not an improved version of the sense, with slight verbal changes in the Greek, but a pure and absolute fiction, in which Luke conveyed his own ideas as to what ought to have been done.

But now to return from this digression. I have set before you the attitude about Luke's historical credibility taken at the present day, not indeed by all scholars, probably not even by the majority, but still by a considerable number of good scholars. I have asked you to contrast this present-day attitude with that which was characteristic of the period about twenty years ago, when no one seemed willing to say a good word for this great and outstanding historian. What is the reason for this remarkable change, the most marked change that has occurred in respect of any book and any writer in the whole range of the Bible?

The reason originated in this, that people began to observe and study minutely the country about which the second part of Acts mainly treats, and in which the evolution of Christian history had its centre and chief seat in the period that followed after the middle of the first century: viz., Asia Minor. It became clear, and now stands out beyond the reach of denial

from rational persons, that the book of Acts stands in the closest relation with the geography and the situation of Asia Minor, in the first century. The book could not have been written in the second century, as the later nineteenth-century scholars declared it to be, because it is inconsistent with the situation of Asia Minor in the second century; it assumes conditions and relations that ceased to exist before the date when it was declared to have been fabricated, and must have passed out of the consciousness of men; it is a document that is stamped as of the first century on the ordinary canons of criticism, and marked as originating from contemporary record by its vividness and individuality.

The detail that first caught my attention in this connection was a slight matter in itself, but just the sort of small incidental, unimportant circumstance by which date and knowledge or ignorance are tested. In Acts xiv, 6, Paul and Barnabas are said to have fled from Iconium to the cities of Lycaonia, Lystra and Derbe. No one could speak thus who did not know that the boundary of Lycaonia was so drawn that in going from Iconium to Lystra, Paul crossed the frontier and entered the district of Lycaonia. Now, Iconium was distinct and separate from Lycaonia all through the Roman Imperial time; the frontier lay just a little south of Iconium and north of Lystra during the first century; but in the early second century, Lystra became separated from Lycaonia and closely connected with Iconium, and it formed a part of the division of the Empire to which Iconium belonged. There ceased, then, to be a frontier between Iconium and Lystra; and Acts xiv, 6, could not have been written later. This slight point is one involving much patient research, and requiring a decision on many minute questions of historical and political geography, which have slowly and gradually been solved one by one; hence this small detail, the first to arrest my attention when I was beginning to study Luke as an authority for the geography, has only been solved in its full extent after many years of careful examination. The first discussion which I ventured to publish on this point was incomplete: it was not wrong in any way, because it was confined to the statement of facts and the drawing of the inevitable and undeniable inferences; but there was much more to say, which I cannot here state in full.

This little point is typical. You see how long a time, how much labour, how many journeys, have been required before we have attained sufficient knowledge of the condition of the country in St. Paul's time to understand all that is implied in this slight detail. It is the same with everything in the travel-

narrative of Acts. The narrative springs direct from experience of the localities and districts and boundaries as they were when the journeys were made. Had the scene lain only in the great Province of Asia, with Ephesus as its port and its commercial centre, we could not have got much clear evidence of date, for the bounds and divisions of the Province of Asia remained practically unchanged throughout the first three centuries. In that part of the narrative we can find abundant proofs of vividness in knowledge, but not directly of date. But the scene lies partly in the newer Province Galatia, whose extent, divisions, government and boundaries varied greatly during the first two centuries. In the narrative we are conducted stage by stage in Paul's company; we traverse the districts of the Province and feel the delicate, hardly perceptible indications of bounds as we pass from one district to another; and the districts and limits of this Province that are shown in the Acts are those of the first century. We note that the population of Iconium, a Hellenic city, are called Hellenes; but that the population of Lystra and Pisidian Antioch, two Roman colonies, are styled simply "the multitude," a term used regularly in the inscriptions of this region to translate the Latin term *plebs*. In one detail after another the evidence of truth and minute accuracy accumulates. The more we learn of the country, which was practically a *terra incognita* until quite recently, the better do we appreciate the vividness and the accuracy. There is much yet to learn, and there is no doubt that future discovery will only strengthen and increase the evidence already accumulated in support of the book of the Acts.

But I must conclude, and the conclusion must always be the same, to express the wonder which fills me that it is so difficult to interest the Churches in the discovery of the evidence bearing on this subject. We want to excavate the cities of Palestine and the cities of St. Paul. There lies hid the evidence that will settle numberless Biblical questions and difficulties. Why is it that, if you ask for the cost of excavating a first-rate city of Palestine, you will get a few hundreds, barely a tenth of the money needed; if you ask for money to excavate such a site as Lystra, nothing is given? Is it that they are afraid of the results and shrink from submitting their books to the test of discovery? I do not think that is so, but they are infected too deeply with what has always been the vice and the weakness of the Christian Churches and sects, hatred of one another. That hatred and disunion has always been the main support of their enemies, who can always trust to find allies among some of the

Christians against others. Just as still in Jerusalem in the Church of the Holy Sepulchre on the anniversary of the Resurrection of the Saviour, it is necessary to have Turkish soldiers on the spot to prevent the rival sects from tearing one another to pieces, so now in Britain, while you can raise fifty or a hundred thousand pounds to fight a rival sect, you would not find it easy to raise a hundred pence from the same class of people to place the history of the New Testament or of the Old on an infinitely higher level of historical attestation. While you can get as many great leaders as you want for any inter-Christian war, you might ask in vain any of those leaders to speak a word in favour of the enterprise which I am now speaking about. In a controversy about education in England, which to a mere Scotchman is an unintelligible and trifling point, a mere question "about words and names and your own law," exaggerated into realities by hot controversialists on both sides, both equally far removed from wisdom and calm judgment, I understand that a certain great demonstration cost as much as would have excavated half a dozen great Bible cities and given priceless knowledge. And in Scotland, for equally trifling differences, invisible to the unaided eye of an Englishman, we spend ten times as much as you spend in England. And so the wordy war goes on in endless succession of years, and we learn nothing, but sacrifice the whole essence and life of Christianity to fight with our brothers and countrymen. This constant warfare is the shame of Christianity, as well as its weakness. A Gallio, if he had to try the case in the year 1907, would not be content to drive them from the judgment seat, he would be strongly inclined, in the interest of peace and order, to hang ten of the principal leaders on each side, stringing them up side by side in alternation. We wonder that the Greek Christian and the Slav Christian loathe one another; we do the same ourselves, but the strong arm of the law and a more law-abiding instinct prevents us from carrying our mutual hatred so far as Slav and Greek carry it.

DISCUSSION.

Rev. Canon GIRDLESTONE.—Canon Girdlestone expressed the thanks of the meeting to Sir W. Ramsay, who had bravely fought his way to the truth amid difficulties of many kinds. He had

brought out clearly that St. Luke was a historian of the best type, and that both the Gospel and the Acts were trustworthy documents. The New Testament historians followed the precedent established by those to whom we owe the great historical records contained in the Old Testament. The Church at large owed a great debt to Professor Ramsay, not only for such books as *Paul the Traveller*, but also for the toil and travel endured in Asia Minor, which had made the publication of these books possible.

Mr. MARTIN L. ROUSE.—I congratulate myself upon having, on the strength of an old-time school friendship, invited Sir William Ramsay to read a paper to our Society; since we have thus been able to hear from his own lips one so brimful of delightful learning and overflowing with confirmations of momentous truth.

The destructive critics might all well change their tone, as they see archæology push the art of writing further and further back into the first ages of human history. In 1896 Professor Flinders Petrie gave a public lecture to the British Association, when assembled in Liverpool, entitled "Man before Writing." Treating the hieroglyphs as the earliest sort of writing known to the Egyptians, he proceeded to show that this began with the delineation of objects familiar to them both among plants and animals and among their own buildings and implements, thus proving both the earliness of their artistic skill and of their industrial ingenuity. But at Dover, in 1899, the same eminent explorer read a paper to the same learned body upon an alphabet consisting of "a large series of signs," which was "used in Egypt about 2500 B.C., and which was now shown—by such signs having existed as far back as 5000 B.C.—to be independent of the hieroglyph system or any derivatives of this, while similar signs" found "in Crete showed the system to have extended to the Mediterranean about 2000 B.C."

The Tell Amarna tablets, along with those other cuneiform tablets more recently found in the north of Canaan, prove that as early as the time of Joshua, every Canaanite sheikh was familiar with writing, and probably that many a sheikh's wife was also, since we find in the former collection two letters from a Lady Basmath, who had been forced to flee afar from the invading 'Abiri; while in the Sinaitic mines and their adjoining temples, Professor Petrie, as he reported last year, has found many Semitic inscriptions of the workmen of the Pharaohs contemporary with Moses.

That parchment or papyrus was used as well as stone or clay, and probably more often, for recording events in the flourishing period of the Israelite Kingdoms, is proved by the Siloam inscription; the writing, of which as Sayce has pointed out, is not upright and stiff, but sloped and free like that of a man wont to write with ink upon paper.

Since even that most destructive critic, Harnack, has joined the mass of deep scholars in acknowledging that Acts and Luke are two parts of one author's book, it seems hardly needful to cite the important coincidence discovered by Blass and quoted in Professor Ramsay's book, *Was Christ Born in Bethlehem?* that the Codex Bezae of the sixth century shows a peculiar spelling of the name of John in Luke and Acts, where, save in three instances only, it occurs as *Joanes*, whereas in the three other Gospels it is almost invariably spelt *Joannes*. [But one might further add that since the name is the Grecized form of the Hebrew *Johanan*, it would be natural for the other gospel writers, who were Hebrews, to spell it with two *n*'s; whereas if the name in a Greek dress had already grown fairly common among the Grecian Jews, it may well have lost one of its *n*'s in practice and been therefore naturally spelt with one by the Macedonian Luke.]

It had long been noticed that Luke correctly gave the peculiar titles of the rulers of particular cities and provinces evangelised by Paul; but it was thought at one time that Cyprus was an exception, inasmuch as a province so small and apparently in full tranquillity would have been governed by a prætor or a proprætor, not by a proconsul. But a Greek inscription was found by General Cesnola at Soloi, a Cyprian town, dated "in the proconsulship of Paulus."

This fact, which Professor Ramsay records in his work *St. Paul the Traveller* (p. 74 and note) is parallel to another, which he himself has been the first to establish. From the discoveries of Kenyon, Grenfell and Hunt, and others, confirmed by his own researches, Professor Ramsay proves that from 22 B.C. down to A.D. 231, at least, there was a census of population held in Egypt and Syria and probably the whole of the Roman Empire once in every fourteen years. This would make one due in Syria (which, of course, included Palestine) in 8 B.C. Again, by comparing the fragment of a monument to Quirinus, found at Tibur, with the records of Suetonius and Strabo, he ascertains that Quirinus not only governed

Syria between A.D. 6 and 9, when he carried out the famous valuation and taxing of property which led to revolt in Judæa, but also held the command-in-chief of the forces and the military governorship of Cilicia and Syria, somewhere between 8 and 5 B.C., during which time he subdued the powerful robber race which dwelt in the mountains between Galatia and Cilicia. The census of Luke II. was thus certainly held in the course of this his first term of office; only Professor Ramsay thinks that, because Herod had seriously offended Augustus in 8 B.C., and had to send two embassies to Rome before the Emperor would be appeased, the census was probably delayed from 8 B.C. to 6 B.C., so that our Lord was born into the world in the last named year.

Rev. ALEXANDER IRVING, D.Sc., expressed the great pleasure he had felt in listening to this paper and his gratitude to Sir William Ramsay for the light which his writings had thrown upon the origin of the New Testament documents. His work, *The Church in the Roman Empire before A.D. 170*, was in this respect the most illuminating book he had met with since he read Mommson's *History of the Provinces of the Empire*. The International Geological Congress had imprinted upon the face of its publications the motto: *Mente et Malleo*, which might be freely translated, "With brains and the hammer." That expressed in a concise phrase the leading principle of geological method, and emphasized *field-work* as the basis of that inductive science. Sir William had in his paper, and in the splendid field-work, on which it was based, brought all serious students to the position which enabled them to see that archæological research (when rightly followed) was reducible to a method which might be characterised by the phrase: *Mente et Spatula*, "With brains and the spade." The great importance of the application of the inductive method (getting your facts by careful and accurate observation and then reasoning inductively from them), as in this case, to the trustworthiness of ancient documents, could scarcely be doubted. The contrary method of reasoning from negative evidence, and of evolving ideas by mere scholars out of their inner consciousness; ideas which came to be accepted for a time as theories, on account of the authority in the world of scholarship of those who propounded them; ideas which were often characterised by their nebulous origin in the region of what was called "higher criticism"—he had long regarded as thoroughly unscientific.

The speaker was struck with what the Professor had said as to the fallacy of supposing that the intellectual progress of Humanity had been one continued process of evolutionary growth ; and thought people often forgot how greatly the intellectual night, which settled upon Europe between the Fall of the Western Empire and the Renaissance of Learning in the West, after the Fall of Constantinople in the fifteenth century, was due to the wanton destruction in the fourth and seventh centuries of the libraries and museums of Alexandria, which Mommsen had described as the great and unique university of the Empire in the first three centuries.

As to the widespread use of *writing* of some sort in the time of Moses and earlier, and the fashionable scepticism on this subject for some thirty years after Ewald, he had hoped to hear some remarks from a gentleman in the room, who, among other valuable labours, had given us a translation of the Laws of Amraphel from the cuneiform inscriptions on diorite at Susa.

The abrupt ending of St. Luke's history, as contained in *The Acts*, had often struck him as somewhat extraordinary ; and a new light seemed to be thrown on what he might almost call the truncated form of that document by Sir William's suggestion, that the disappearance of St. Luke from the gospel history is to be probably accounted for by his death from persecution or some other cause.

It had always seemed to the speaker a remarkable fact, that St. Luke should bring St. Paul to Rome and tell us that he spent two years there as a state-prisoner, with full liberty to receive his friends and discuss with them " things concerning the Lord Jesus Christ," without indicating any result to the Church and the world. Years ago he read a paper on the Origin of the Epistle to the Hebrews to the Wokingham Clerical Society, in which he propounded the hypothesis (based on such glimpses as we have of the social and intellectual life of the Hebrew colony then in Rome), that the said Epistle might have been based on the notes made at the time by Luke (and perhaps Clement) of those discussions which St. Paul carried on at that period with his own countrymen ; a hypothesis which seemed strengthened by certain internal indications. That might account for the Epistle being Paulistic in matter, though not Pauline in form and style ; and he now thought that the suggested probability of Luke's unexpected death might go some way to explain its anonymity. He would be glad to know if Sir William's intimate

knowledge of matters incidental to St. Luke and his history gave any countenance to such an idea.

It was refreshing to find Harnack refuted by Harnack, if only to remind us that the "accepted conclusions" of mere critics and scholars (based to a large extent on negative evidence) can have *to the scientific mind nothing of the nature of finality*; and that deductions drawn from them can have no surer value than the nebulous data upon which they too often rest.

Dr. T. G. PINCHES.—I have listened to Professor Ramsay's lecture with much interest, but as it refers to the criticism of the New Testament, whilst my own subject has to do with the antiquities of the Old Testament, I did not expect to be called upon to speak this afternoon. Referring to the antiquity of writing, there can be no doubt whatever as to the testimony of the Babylonian tablets upon that point. Among the most ancient documents may be mentioned the archaic tablets* published by M. François Thureau-Dangin, of the Museum of the Louvre, in which we seem to see the growth of the sense of the necessity of precision in the matter of dating. Those which seem to be the earliest specimens have no dates, but on some—perhaps later documents—we find names of rulers, sometimes with their titles, but neither month nor day, the necessity for inserting which, however, soon became evident. As time went on, the scribes of Babylonia adopted methods still more precise, indicating the date at first by the event of the year, and finally by giving the regnal year of the king.†

Another point in Professor Ramsay's remarks which struck me was his statement that the use of ink to write on pottery implied of necessity the use of some softer material to receive the inscription. From Babylonia and Assyria we get nothing of the nature of a document on either paper, skin, or parchment, but that something of the kind was used is implied by at least one colophon, written in ink of a reddish colour (possibly originally black) upon a fragment of a clay tablet from Nineveh in the British Museum. This reminds us that there are represented on the Assyrian sculptures, scribes, one with a tablet and the other with something of the

* Estimated date 4500 B.C.

† The Assyrians used the system of dating by the names of officials, which were chosen yearly, the so-called eponyms.

nature of a scroll, writing down the tale of the heads of slain enemies, or lists of the spoil.

But, as I have said, I cannot speak upon the subject now before us. I take this opportunity, however, to express my appreciation of the very interesting lecture which Professor Ramsay has delivered upon a subject of much importance.

Colonel G. MACKINLAY.—I had not intended to make any remarks, but as a previous speaker referred to Sir William Ramsay's excellent book, *Was Christ born in Bethlehem?* and to the date of Quirinus' first tenure of rule in Syria, I should like to ask Sir William, if any known historical fact gives a distinct negation to the date 8 B.C. for the Nativity, a date which is distinctly indicated by a certain line of inference?

I beg to join my thanks with those of others for the very useful and instructive paper which we have just heard.

Professor RAMSAY.—No known fact absolutely prevents this conclusion; but I await with pleasure Colonel Mackinlay's book upon the subject.

The vote of thanks of the meeting having been put from the chair, was carried unanimously; and the meeting separated.

ORDINARY GENERAL MEETING.*

THEOPHILUS G. PINCHES, Esq., LL.D., IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed.

The following elections were announced :

ASSOCIATE.—Mrs. Charles Chevenix Trench.

MISSIONARY ASSOCIATES.—Miss. L. G. Robinson ; Rev. W. S. Moule ;
Edward C. Woodley, Esq., Principal of Lond. Miss. College,
Calcutta.

The following paper was then read by the Secretary in the absence of the author :

RECENT DISCOVERIES IN PALESTINE IN RELATION TO THE BIBLE. By Dr. E. W. G. MASTERMAN.

DISCOVERIES in Oriental lands are now accumulating so fast, and excavations are being conducted by so many societies and nationalities, that to keep pace with them requires vigilant and unremitting study, and to report them all would require volumes. There are few discoveries in ancient "Bible lands" which have not some bearing on the Holy Scriptures especially in as far as the Bible claims to be a true history of the progressive revelation of the one and only God. The bearing of all such discoveries may be looked upon as threefold, to confirm, to illustrate, and to interpret the language of the Bible. At one time the first was looked upon as the one thing of consequence, but to-day, to a large extent, the illustration of the Scriptures and its interpretation is generally recognised as at least as important. The kind of man "who will believe anything that is *not* in the Bible" is disappearing, and it is generally recognised that the Old Testament, as a collection of historical documents, has the highest claims to consideration by secular historians, while, on the other hand, we know that records in clay and stone are by no means free from mistakes and even wilful misstatements.

The position of Palestine with regard to all such investigations must ever be unique. In the first place all light thrown on

* Monday, May 13th, 1907

Oriental ancient history has made it increasingly evident how important was Palestine as a meeting place of all the great civilisations and races of the ancient world. The tendency of a few years back was to picture the patriarchs as unsophisticated bedawin in a land which was a kind of back water amidst the currents of the ancient stream of civilisation. Now all this has been altered. To quote the words of Professor George Adam Smith*—

“Where formerly the figure of the ‘Father of the Faithful’ and his caravans moved solemnly in high outline through an almost empty world, we see (by the aid of the monuments) embassies, armies and long lines of traders crossing, by paths still used, the narrow bridge which Palestine forms between the two great centres of early civilization, the constant drift of desert tribes upon the fertile land, and, within the latter, the frequent villages, and their busy fields, the mountain keeps with their Egyptian garrisons and the cities on their mounds, walled with broad bulwarks of brick and stone.”

It was in no out-of-the-way corner of the earth that the race, through whom revelation came, was located by the Divine purpose, but in the very turmoil of the strife of nations, buffeted between the smaller nations in the immediate neighbourhood, the Philistines, the Ammonites, the Moabites, the Edomites, the Syrians and the restless children of the Desert, and ground betwixt the interchange of blow upon blow between Assyria or Babylonia or Græco-Syrian Empire of the Seleucidæ and Egypt. How small and how weak a race they were in almost all their history we realise as they appear as two small states, among many others, in the monuments. And yet God prepared this race as He moulds the choicest individual characters of His saints—in the hot furnace of affliction. What they went through can be clearly traced, as we look back, as a purifying influence on their religion, so that—

“We are able to look at the history of the North Semites as one great connected series of events co-operating towards the making and discipline of Israel”†—

an explanation of the philosophy of history which we can understand if we recognise that—

“Judaism was incomparably the greatest gift to the world in ancient times.”†

* *Modern Criticism and the Preaching of the Old Testament.*

† J. F. McCurdy, art. “Semites,” *Hastings Bible Dictionary*, ext. vol.

And yet though Palestine would at the first thought appear to be the most important land for those investigations which should illuminate the Scriptures there undoubtedly has been a tendency among archæologists to belittle the results of investigations there as compared with those of Egypt, Greece and Mesopotamia. It may be admitted at once that the contributions to the *general* history of mankind from these three latter sources are vastly greater than have been obtained by the comparatively scanty excavations which have been carried out in Palestine. But the light thrown directly on the Bible by investigations in the Holy Land have been out of all proportion to the extent of the excavations, and without doubt most important discoveries yet lie hidden there under the heaped up dust of many "tells." The earlier scientific explorers concerned themselves with surface surveys, and as a result of their labours the majority of place-names in the Bible has been identified through, in many cases, the survival of ancient Hebrew or Greek names, often under an Arabic form, and even at times translated into Arabic. It may, however, be added that the situation of several of the most important places such as Lachish, Gath, Gezer, Megiddo, Taanach and Mareshah which had been thus tentatively fixed, have through the work of excavators been now rendered certain. Thanks to this brilliant group of military engineers employed by the "Palestine Exploration Fund," the course of the great trade routes, and of conquering armies, and the sites of ancient battles are now carefully mapped out. The climate of Palestine is now known as well as that of England, and is much more easily comprehended; its study has thrown considerable light on many Scripture passages as it is substantially the same as in Old Testament times. The customs of the people of the Holy Land have been recently studied as never before. No people have kept up the primitive type of Oriental habits and customs so unchanged as have the Syrian bedawin—and at least a large proportion of the *fellahîn*. For our new knowledge of ancient customs and habits of life we are indebted to the recent explorers, Bliss, Macalister, Sellin, Schumacher and Benzinger; for recent information on the modern customs of the *fellahîn* and bedawin we are indebted to a host of workers. Among them the late Professor S. Ives Curtiss may be particularly mentioned for his special line of research on the survival to-day of PRIMITIVE SEMITIC RELIGION.*

* *Primitive Semitic Religion To-day*, Prof. Ives Curtiss, of Chicago.

He has shown conclusively that among the modern inhabitants of Palestine and Syria there survive many primitive beliefs which are common to, and historically go back before, the organised religions—Moslem, Christian and Druze. Going to the land in the first instance a disciple of the late Professor Robertson Smith, and accepting his teaching that the sacrificial meal was the oldest form of sacrifice, three summers of investigation convinced him how primitive and ingrained was the institution of the bloody sacrifice and the belief in the need of "redemption." He found that the putting of the blood of a sacrificed victim on the door-posts and lintel—even on the tent cords of the bedawin—survives all over the land to-day. When foundations of new buildings are dug it is common to make a "foundation sacrifice," the blood being allowed to flow to the bottom of the trench. On one occasion, the explanation offered by a *Sheikh* standing by was as follows*—

"Every building must have its death—man, woman, child or animal. God has appointed a redemption for every building, through sacrifice. If God has accepted the sacrifice, He has redeemed the house."

In all parts there are "sacrifices for the dead,"—

"They kill animals for the dead in behalf of his spirit. They go before him as light, serve him as he approaches God,"†

as one man explained.

In the same way there are sacrifices in fulfilment of vows, sacrifices "between the feet," the victim being killed while the man stands with his legs on each side of the animal, sacrifices (in the *Nablus* district) when a reconciliation takes place between the avenger of blood and the murderer, and so on. The conclusion of Professor Curtiss is that the importance of the "shedding of blood" and the necessity of "redemption" belong to the primary religious instincts of the Semites.

A second series of investigations were concerned with the survival to-day of "High places" or local sanctuaries. Professor Curtiss found that among the ignorant *fellahin* and bedawin, unaffected as many of them are by either Mahommedanism or Christianity, the conceptions of God are at the same primitive stage as it was among the Canaanites or earliest Israelites. On the one hand the ideas of God are anthropomorphic in the extreme; on the other far more reverence and respect is paid to the local shrines or "Welies" than towards God Himself.‡

* p. 196, *loc. cit.*

† p. 178, *loc. cit.*

‡ p. 129, etc. *loc. cit.*

"The relation of the modern Semites to the 'saints' is entirely different from that to God. The people are in fear of them, and seek to secure their favour through gifts and to avert misfortune by timely and satisfactory offering. . . . They are the deities whom the people fear, love, serve and adore . . . practically many people know no other God. An oath by a *Wely* or a sacred tomb is often far more binding than one in the name of God. They will swear falsely by God when they dare not do so by the *Wely*."^{*}

These holy places are all over Palestine and Syria, while sacred groves, marking ancient "High places," are common everywhere. There is no part of the country without them and *they are revered to-day*. The spirit of some saint—or *jinn*—is supposed to reside in the grove, and he visits any injury to his property with death. Often at such shrines—or at sacred groves—articles are left in the safe keeping of the saint, such as ploughs, bundles of wood, jars, etc.; no one dares touch them, for the spirit of the grove, or of the saint, is guarding them. The "holy men" who guard some of these shrines usually have a hereditary right to the post; when sacrifices are made there the guardian "priest" usually receives the hide and one quarter of the sacrificed animal (*cf.* Deut. xviii, 3). According to Professor Curtiss many of the "holy men" at these shrines follow the example of the sons of Eli (*cf.* 1 Sam. ii, 22). Many go about half clad and are credited with a gift of prophecy. They also practice exorcism. Such then are some of the deepest beliefs of the uneducated *fellaheen* of the Holy Land to-day; as will be shown the earliest traces of religious belief found in the excavations point to much the same ideas thousands of years ago.

The most important recent additions to our knowledge of Ancient Palestine have come from the EXCAVATIONS OF THE PALESTINE TELLS.

The word *tell* has become such a familiar one now in Oriental Archaeology as to have practically been adopted into our language. It is applied by the Arabic speaking peoples of Egypt, Syria and Mesopotamia to a hill of a special kind—a flat-topped artificial mound consisting, as a rule, of the crumbling remains of successive towns built one above the other. All over the East the process of the formation of such "tells" can be seen in the sites of modern villages, which stand to-day on the accumulated dirt and ruins of their predecessors of a few generations back. When such towns were destroyed

*. This is true of Moslem, Christian and Jew.

or their sites deserted, the returning or new occupiers usually found it more convenient to start with entirely new house foundations and streets than to unearth the old. "Tells" are scattered all over Palestine but more particularly in, or on the edges of the great plains; towns built on steep rocky sites are frequently refounded on the rock, the old foundations being thrown over or utilised, but on level ground it was easier to build upon the old rubbish than to remove it.

The first work on the "tells" was begun at *Tell el Hesy*, a site on the edge of the Philistine Plain, by Professor Flinders Petrie, on behalf of the "Palestine Exploration Fund," in 1890. In a six weeks' reconnaissance this explorer was able with the practised eye of an expert to lay down general lines with respect to the dating of the successive strata by means of the pottery, which with but slight modifications, have been followed by all the subsequent workers.

Dr. F. J. Bliss took up the work when Professor Petrie left it, until 1893. The results he published in a small volume entitled *A Mound of Many Cities*. After a spell of work at the walls of Jerusalem (see below) Dr. Bliss in conjunction with Mr. R. A. S. Macalister explored some of the "tells" of the Shaphelah or low hill country of Judea. The area in which the firman permitted work to be done included *Tell Zakareyeh* (perhaps Azekah), *Tell Judeydeh* (an unknown site), *Tell es Sāfi* (probably Gath), *Tell Sandahannah* (Mareashah) and *Tell Shuweikeh* (Socoh). Of these sites all but the last were attacked.* At *Tell es Sāfi* little could be done through the hill-top being largely occupied by another village. This was the more disappointing as of all the sites this is the one most striking, its commanding situation at the very entrance to the historic Vale of Elah and its good and abundant water supply point to this as the site of an important place. *Tell Zakareyeh* and *Tell Judeydeh* did not yield very great results, though the work there was a necessary stepping stone to the understanding of that at Gezer. Of all places the uninhabited *Tell Sandahannah*—so called after the church of St. Anne, whose ruins lie in the neighbourhood—should have yielded a rich harvest, but unfortunately the "firman" expired before little more than the upper layer of what proved to be the Greek city of Marissa had been explored. The site is without doubt that of Mareashah, a city fortified by Rehoboam (2 Chron. xi, 8), the

* For full account see *Excavations in Palestine, 1898-1900*, F. J. Bliss and R. A. S. Macalister, Palestine Exploration Fund

locality of a battle between Asa and the Ethiopians (2 Chron. xiv, 9-10) and probably the home of the prophet Micah (Micah i). The remains of the ancient period still lie beneath those of the Greek city, waiting excavation. Advantage was taken of the opportunity to thoroughly explore the extraordinary labyrinths of caves lying in and around this *tell*. They are the most wonderful relics of the troglodyte "Horites" in the land, but have been used as refuges in several succeeding ages. With a new "firman" Mr. R. A. S. Macalister was engaged during 1903-4-5 in excavating, on behalf of the "Palestine Exploration Fund," *Tell el Jezer* (or *Jezereh*), the site of the important city of Gezer. The work of this period has proved so rich in results that this Society has just obtained another "firman" or Government permission to work two years more at this place. It is the ambition of the explorer and his supporters that the whole *tell* should be overhauled down to the primitive rock and that every foot of *débris* should be examined. As nothing like this has ever yet been attempted with any other *tell* in the land, it is highly desirable that it should be done now. The peculiar position of the *tell*, within easy reach of both high road and railway between Jaffa and Jerusalem, the fact that almost the whole of it is available for excavation—the modern village being on the south slope outside the lines of the ancient walls—and the circumstance that the *tell* is owned by Europeans, all combine to give this site advantages to the archaeological explorer which cannot be found elsewhere in Palestine.

While the English Society have been investigating these southern "tells" the German Palestine Society have carried on extensive excavations on the enormous *Tell Mutasellim* (lit. "Hill of the Governor") close to *El Lejjûn* and at the entrance to the important and historic pass through the Northern Samaritan Hills from the Plain of Esdraelon to that of Sharon. Although *El Lejjûn* (? = the legion) was long accepted by many authorities as the site of Megiddo, few who have seen the ruined foundations of the successive cities which for many centuries stood on *Tell Mutasellim*, and the position of the *tell* itself as viewed from any spot on the boundaries of the Great Plain of Esdraelon, will for a moment doubt that this, and not *El Lejjûn*, is the actual site of the great fortress-city of Megiddo. The excavations at the spot were initiated in the spring of 1903 by Dr. Schumacher of Haifa, and were further carried on by Dr. Benzinger, the expenses of the later excavations being largely defrayed by a liberal donation from H.M. the German Emperor.

At a spot within sight of this work Professor Sellin of Vienna commenced in March, 1902, an independent excavation. This was at *Tell Ta'anuk*, the undoubted site of the fortified city of Taanach. Although the hill was small its situation was favourable, there being no modern buildings on the summit; the site, too, had evidently been entirely deserted since about 600 B.C. except for some scanty Arab remains of a thousand years back, easily removed. It seems probable to Professor Sellin that the destruction of the town occurred in 608 B.C. at the time of the battle of Megiddo, but two and a half miles away, when the pious King Josiah was killed (II Kings xxiii, 29-30, II Chron. xxv, 20-24). Going back from this time a continuous occupation of the hill from 1,500 to 2,000 years can be traced; no remains of Neolithic troglodytes were found there as at Gezer. At present there is a pause in the general activity, but several societies are making plans for renewed work;* it is therefore a good time to review the general results. In doing this I shall refer to Gezer primarily, as the work there has been most systematic and most fruitful in results, and is the one I have most thoroughly followed by frequent visits, but the work at the other "tells" will be referred to throughout for the purposes of comparison.

It is manifest at the outset that no results can be of historical value unless the remains of the various superimposed civilisations can be approximately dated. An object found, say, a piece of jewellery, a sherd of pottery or even a skull, which may be intrinsically worthless, may be archæologically a priceless relique if belonging to a certain period. In digging through a *tell* the depth from the surface will of course give some indication of relative age, though allowance must always be made for objects falling down crevasses, etc., to strata earlier than their own period. Unfortunately, the number of feet of rubbish which accumulates during, say, a century, varies so greatly that calculations based on that alone are most precarious. Another means of making a rough calculation regarding the age of any stratum of city remains is the presence or absence of metal. A "stone age," a "bronze age," and an "iron age," may be traced in Palestine as elsewhere. The first use of iron came in *about* the time, calculated from Bible data, of the arrival of the Hebrews; we cannot date the beginning of the use of bronze, it is found all over the historic period, but the farther back we go the less bronze and the more flint instruments occur, until at

* See note at end.

last we reach back to a prehistoric age when flints alone are used. We have fortunately one extremely valuable indication for dating the strata of the "tells"—this is the pottery. Though so friable, pottery is, unless deliberately ground up, practically indestructible, and even in small fragments has a sure tale to tell to the experienced judge. The making of pottery is also one of the oldest arts; jars of various kinds are found with the earliest remains of the stone age in Palestine. There have been changing fashions in pottery, both in the material and in the forms and decoration of the vessels. The use of many distinctive types was synchronous all over the known civilised world. Though commonly found in fragments there is no period which has not left perfect specimens of its pottery types in tombs or caves or cisterns, so that the experienced worker knows just where he is historically when he sees the pottery emerge. Even strolling over the surface of a *tell* he can judge very expeditiously the date of the last occupation by the Roman, Greek, or Hebrew sherds which lie exposed by every winter's rainfall.

All the workers in Palestine recognise one main series of types, following the lines laid down by the experienced Egyptian explorer, Professor Petrie, during his six weeks' work at *Tell el Hesi*. The chief differences of opinion are in the names which should be given to the types of certain periods. The designations vary somewhat with individual workers, but the dating of the types within a century or so is now fairly fixed. The following are in brief outline the chief classes recognised:

A. PREHISTORIC PERIOD.

Earliest primitive pottery, found so far only among the troglodytes of Gezer. It is roughly made and very porous. Date uncertain, certainly as far back as 3000 B.C., and possibly as 4000 B.C.

B. HISTORIC PERIODS.

I. (a) *Early Amorite* or *Early Pre-Israelite*: before 1600 B.C. Found at Gezer in Stratum III together with many Hyksos scarabs; probably as early as 2000 B.C.; found in the earliest remains at *Tell Ta'anuk*, *Tell el Hesi*, *Tell es Şāfi*, and *Tell Judeydeh*.

(b) *Later Amorite* or *Late Pre-Israelite* (1600-1300 B.C.). Pottery showing a great advance in culture, analogous to that of Cyprus, Mykene, and Egypt, and, according to Sayce, showing Hittite influence. Found in all the tells except *Sandahannah*.

II. (a) *Phœnician influence predominant* (1300-1000 B.C.). Found in the fifth layer in Gezer. Macalister calls it "transitional." Period from Judges to Solomon.

(b) *Later Phœnician*—the most characteristically Hebrew, 1000-800 B.C.—and later. Iron now appears and begins to replace bronze and flint instruments. Cypriote pottery also marked. In S. Palestine jar handles with Hebrew stamps now appear.

III. (a) *Hellenic influences appear*—800-600 B.C.—at *Tell Ta'anuk* only. The terra cotta altar of incense with human and animal heads belongs to this stratum. Nothing answering to this period in S. Palestine.

(b) *Later Hellenic*—Seleucidan pottery—after 300 B.C. Most of the pottery of *Tell Sandahannah* and some of that in upper layers at Gezer and on the surface at *Tell el Judeydeh* belong to this period.

IV. *Roman pottery*—found on the surface of "tells" all over the land. Many of the lamps found in tombs at Gezer belong to this class.*

In addition to the indications enumerated there are happily positive indications which are of the greatest use in checking the results arrived at along other lines. These are objects which can be definitely dated, for example, cuneiform and Hebrew inscriptions, Egyptian scarabs and articles of jewellery, and, for the later periods, Greek and Latin inscriptions, coins and lamps. Of all these, the scarabs are probably the most practically useful; they frequently contain the names of well-known kings, others from their designs can with assurance be assigned to definite dynasties. At Gezer great numbers of Hyksos scarabs, mostly unnamed, have been found, pointing to an Egyptian influence in Syria 700 years earlier than is recorded on any Egyptian inscriptions. Among the scarabs with royal cartouches occur those of Khyan (about 3100 B.C.), Usertesen I. (2758-2714 B.C.) Thothmosis III. (1503-1449 B.C.), Amenhotep III. and Queen Tyi (1414-1379 B.C.), and others of later dynasties. On the topmost stratum was found a small slab of red sandstone with an inscription in which occurs the name Naifaaaurud, the first king of the XXIXth dynasty (399-393 B.C.).† The cuneiform inscriptions are even more interesting, for example, the one

* The above classification is a combination of those of Mr. Macalister and Prof. Sellin.

† Dates are quoted from Petrie's *History of Egypt*.

tablet found at *Tell el Hesj* was found to be one of the *Tell el Amarna* series and contained references to Zimirida, the Governor of Lachish (of which *Tell el Hesj* contains the remains) at the time of Amenhotep IV., while we learn from a letter of the same series from the governor of Jerusalem that this man was killed at Lachish by the servants of the Egyptian king. The collection of tablets found in a crumbling box at *Ta'anuk* belong apparently to the same period, but the two Assyrian contract tablets found at Gezer are very much later.

It is impossible to give here in any but this scanty outline the various data by which it is now possible to assign to their historic periods the strata of a *tell*, but it may be considered a settled question that the remains of a given city, belonging to any historic time, can be dated with assurance within a century.

In describing the main results of these investigations, as bearing on the Holy Scriptures, it will be convenient to do so under those headings—(I) The religious beliefs; (II) The condition of culture and social life; and (III) The light thrown on definite historical events recorded in sacred history.

I. *The religious beliefs of the early inhabitants of Palestine.*

The evidence is gathered from two sources:—

- (a) the tombs,
- (b) the High places.

(a) All the facts we can gather from the early interments in Palestine point to a belief in the survival of the spirit after death. It is without doubt something very different from the "hope of immortality" and "a joyous resurrection," but it is evidence of a fundamental instinctive belief in the idea of an after-life. This is important, because some would maintain that the Israelites and their racial allies had no belief in an after-life until quite a late stage in their religious development. The first inhabitants of Gezer, in the prehistoric time, were a non-Semitic race,* who, like the leading people of Babylonia in early times, cremated their dead. The crematorium which was unearthed was a cave skilfully arranged with a draught-chimney, by which cremation could be accomplished thoroughly and speedily. The

* As proved by the bones examined by Prof. Macalister, F.R.S. See *Q. Stat. P.E.F.*, 1902, pp. 353-354.

interesting thing is, that with the bodies, probably those of local celebrities, were deposited food vessels once containing food for the spirits of the departed. Some of the vessels appear to have been partially burnt at the time of the cremation. At the next period—that of the earliest Semitic peoples which we may for want of a better name call early Canaanites—the bodies, laid on the left side with the knees drawn up, are buried in caves. Here the arrangements for supplying the deceased with nourishment, and drink were on an elaborate scale, more so than at any later periods. Large vessels with wide mouths and pointed bottoms were found carefully set up on end, evidently because they contained, when placed in the cave, some liquid, and smaller vessels, to be used as “dippers” (exactly as the *fellah* to-day takes water out of such a vessel) were found lying inside them. The food, of which mutton was, by the evidence of the bone fragments, one constituent, was laid on a large dish, and another dish was laid over it, to keep off the dust. In one case a bronze spear-head was put with the food apparently to act as a knife for cutting it up!

In one of these tombs no less than fifty pieces of pottery of different types were found as well as alabaster vessels, jewellery, silver pins, etc., together with scarabs of the XIIth dynasty, including one of Usertesen III. (about 2660 B.C.).

In the later Semitic tombs the bodies are laid in the same position. The offerings of food and drink are continued, but there is a tendency to make the custom a mere form; there are fewer large and valuable jars and many small “dipping jugs.” “Possibly at this period the fluid offerings were ceremoniously poured out.”† Many of the deposited jugs were injured, either having been broken “to liberate the ghost of the object”† so deposited, or simply from a spirit of economy, which becomes marked at a later age. In some tombs bronze weapons were found; in one a magnificent bronze scimitar 23 inches long, in another as many as 131 fine javelin heads.

In the Maccabean age the bodies were laid out flat in *kokim*, and after being allowed to decay, the bones were deposited in ossuary boxes. These boxes were then deposited either in special chambers or sometimes even packed into the *kokim*. At this period pottery is still to some extent laid in the tombs; it is often broken and is found inside a *kôk* or ranged against the wall of the chamber.

* Macalister, *loc. cit.*

The food offerings, as represented by the pottery, become from age to age increasingly a form, until at length in Christian tombs* a heap of broken glass, manifestly in fragments when deposited, is all that represents the custom. During this time, however, another interment custom becomes marked, namely, the deposition of lamps. They are few in the earlier tombs, but increase in numbers as the ages go on, until at length in the early Christian days we find crowds of lamps, mostly unused, deposited in the chief tombs. The change would seem to indicate a refinement of ideas; firstly, a crude semi-materialistic belief that the spirit needs food and drink and weapons as in life, and later, apparently, the idea that *light* is more necessary in the dark underworld. The latter belief, one may suppose, gradually became refined to a more truly spiritual symbolism in the case of the Christians, as is shown by the inscription on one of the lamps, "The Lord is my light."

The indications from the interments are dim, uncertain, and liable to many interpretations, but more important evidence of the primitive Semitic religious beliefs is obtainable from (b) **THE HIGH PLACES**.

The earliest "high place" found at Gezer—one unique of its kind—belongs to the troglodyte, non-Semitic† inhabitants. This consists of a great rock surface (90 feet north to south by 80 feet east to west), covered with those circular marks called "cup marks," which are so common over artificially levelled rock surfaces in Palestine. There is no actual *proof* that they are religious in their nature, but it is impossible to think of any practical use in domestic or social life to which they could have been put. The cup marks at this place number in all eighty-three—the largest is 8 feet in diameter and 9 inches deep, the smallest but a few inches across. In connection with this area there is an opening 1 foot wide—at the bottom of a cup mark—leading into a cave—one of three caves associated with this "high place." This narrow opening appears to have been a kind of "shoot" wherein could be poured sacrificial blood

* It should be explained that though on the *tell* no remains later than Maccabean were found, a great number of Christian tombs were opened in the environs; the remains of this and later periods lie probably underneath the modern village.

† It is impossible to be certain whether this "high place" was pre-Semitic, but it is suggestive that at the mouth of the pre-Semitic crematorium a cup mark was made which at a later period, when the cave became a burial place for the early Semites, was replaced by a *Massebah*.

and other offerings to the gods of the underworld. In the cave to which it led were found a considerable number of bones of pigs, which we know were sacred animals among the early Semites. What the "cup marks" represented, what their use, one cannot guess. They may have been symbolic of the sun or moon, or they may have had practical use in the details of the sacrificial rites.

The great Semitic (Canaanite) "high place" of Gezer, about 120 feet north of the last mentioned, occupied a prominent place in the centre of the hill. The temple, as now uncovered, consists of eight monolith pillars varying from 10 feet 9 inches to 5 feet 5 inches in height, but in line with these are the broken bases of two other pillars. These *Massēbōth* (מַסֵּבֹת)—to use the Hebrew name—are mostly roughly hewn masses of limestone, and all of similar rock to the local limestone, except one, the seventh, which, according to the distinguished geologist Dr. Blanckenhorn, is of a different formation, and is indeed of a kind found around Jerusalem. It has been suggested that possibly this *massebah* was brought from Jerusalem, and, if so, the others may have come from other shrines, trophies perhaps of victories.

In the middle of the series of monoliths—between stones V and VI—is a great rock-cut socket or trough over 6 feet long by 5 feet broad; it lies a little to the west of the alignment of the pillars. It is carefully squared and hollowed out, leaving an inside space (2 feet 10 inches long by 1 foot 11 inches broad by 1 foot 4 inches deep). It is difficult to decide with assurance for what purpose this could have been made. It may have been an altar hollowed out, like one found in Petra* to receive the blood of the victims,† a trough to receive water for lustrations—an essential part of Semitic worship—or, as Mr. Macalister and several experts who have visited the spot think, a socket to hold the pole or *Ashērah*, which we know from the Old Testament was an essential religious symbol at Canaanite high places. If this last was its use, the *Ashērah* must have been an imposing piece of timber to need such a socket, and one not unworthy of standing beside the mighty monoliths. That the *Ashērah* was often large, is implied in Judges vii, 26, where Gideon offers a burnt sacrifice with the wood of the *Ashērah*.

* See article on the "High Place at Petra," *Biblical World*, Jan. 1901.

† The bones of many victims, human and animal, were found thrown pell-mell into a cave close by.

The open-air enclosure in which these sacred emblems stood was paved with stones, and under the pavement at the foot of the stones—to the west—were found large jars containing the remains of newly-born infants. Similar jars with infants' bones were found both at *Tell el Hesj*, at *Tell Mutasellim* and at *Tell Ta'anuk*; at the last mentioned the infant burials were in close association with a very ancient rock-cut altar. There can be no doubt that we have here evidence of the rite of infant sacrifice, and almost certainly it was the custom of the sacrifice of the first-born as carried out by the pre-Israelite Semites. In many of the jars were deposited, with the infant remains, small articles of pottery, possibly food and drink for the infant soul.

In close association with the Temple, and evidently used in connection with its worship at some period, was a cave, so constructed as to be connected by a secret passage, through which a man could just squeeze with difficulty into a second inner cave. It seems very probable that this was used for the giving of oracles and other forms of priestly jugglery. To the east of the Temple area was found a large circular pit, for which no evident use could be assigned until on clearing out the bottom a small "brazen serpent"—in other words, a well-shaped cobra-form serpent of bronze, was found. We know from cuneiform inscriptions that serpents were kept in Babylonian temples, and we read in II Kings xviii, 4, that the children of Israel worshipped a brazen serpent, which is ascribed by tradition to the time of Moses, which Hezekiah had to destroy. Further, the Uraeus or cobra was a guardian serpent, the patron of royalty, and was kept in the temples of Egypt. It is, therefore, a probable theory that this circular enclosure at Gezer was a pit to hold the sacred serpents. Whatever views may be taken with regard to the "oracle cave" or the "serpent pit," the Semitic high place itself is a discovery of the greatest importance, and one which throws a flood of light on many questions connected with the religious beliefs of the Canaanites and early Hebrews. There can be no doubt whatever from the character of the *masséboth* which are unlike anything unearthed in the other Palestinian excavations, that the shrine at Gezer was one of special sanctity and one of the most important in Palestine. What was the worship connected with these emblems? It is highly probable that there was originally at Gezer but one standing stone in the "high place," shaded, may be, by a sacred tree—the forerunner of the *Asherah*. Of all the series, the second, and the shortest, stone is most probably the original one. This has its bluntly pointed top polished by the frequent anointing, rubbing or

kissing of the devout. This was the primitive "Beth-el," the dwelling-place of the local god. Gradually, it may be surmised, other stones were added, until the perfect number (seven) was reached—it is quite clear that the eighth stone was added at a considerably later period. At the outset this idea of the presence of a deity in the stone was the one which made the place sacred; it is one common to the most primitive stages of stone worship among the Semites. Later on, but still at a time of remote antiquity, a new idea arose, and the pillars came to be viewed as phallic images. This, though it might be inferred by the shape of some of the older unhewn stones, is made much more probable through the enormous number of roughly shaped phallic emblems, mostly natural size, found scattered through the débris all around the Temple area. There is no possibility of mistaking these objects, and the connection of these with the *masselôth* is clear; in the immediate neighbourhood of the pillars they are specially plentiful.

Here we have indubitable evidence of the character of the religious ideas which came gradually to be associated with the Temple. When the eighth pillar was erected its form is so pronounced that all can see it was deliberately fashioned to be a *simulacrum priapi*. Now scattered about the Temple and elsewhere in the city, specially in the fourth stratum, are found numbers of earthenware plaques representing a nude figure of *Ashtarte*, the Babylonian Istar—the goddess of fertility. At *Tell Ta'anuk*, similar plaques of *Ashtarte* were found in considerable numbers in the later "Amorite" city—during the Hebrew occupation a new type seems to have here come in. These plaques were most in use in the land about 1600 B.C. Similar figures are found in Babylonia, Susiana, Phœnicia and Cyprus. The most interesting of all those found at Gezer are those in which the goddess is supplied with two horns (one of the figures is of metal and the horns are indisputable); this is no doubt the representation of the much-discussed "Ashteroth Karnain" or Ashteroth (*Ashtarte*) of the two-horns—a place-name in Gen. xiv, 5. Most of the plaques are found broken across the middle; indeed so constantly was this the case, that it has been suggested that they have been broken purposely—ritually. The character of the figure on these plaques is in most cases of such a nature as by rude exaggeration to make the sexual element pronounced, and it is impossible to refrain from associating them with the Temple ritual which seems at this very period to have been concerned with worship of the procreative powers. Now this opens up the question whether the

Ashêrah may not have been the female counterpart of the male *Massêbah*. Originally a tree, and as such the dwelling-place of the deity—like the stone—the idea of fertility may have been increasingly connected with it, so that where the *Massêbah* became a phallus, the pole (Ex. xxxiv, 13, Judges vi, 25, etc.) may have been marked with some conventional sign (such as may be seen in places in Palestine to-day) for the female equivalent of the phallus.

At a still later period the pole itself may have been roughly shaped into a form somewhat similar to that seen on the plaques. That the "grove" or *Ashêrah* was at one time, even in the time of the Hebrew Monarchy, shaped into an image of some kind, seems implied in I Kings xv, 13, and this is admitted by Winckler.* The *Ashêrah* appears, too, to have been draped (II Kings xxiii, 7). In I Kings xv, 13, we read of an image which was erected by Maakah as a horrible or grisly thing for (or belonging to) an *Ashêrah*. "Grisly thing" (R.V. "idol") may here be a substitute for a word which moral or religious delicacy forbade the later scribes to write.† It need hardly be pointed out that there is no philological connection between the words *Ashtarte* and *Ashêrah*, but the latter, the writer would suggest, came gradually to represent the former. *Ashtarte* was "the goddess of fertility and reproduction," as appears strikingly in the myth of the descent of Ishtar. The *Ashêrah* from the first seems to have represented the same ideas—fertility, and later on reproduction; so that unless there was, as is possible, a connection even earlier, the *Ashêrah* gradually became the actual sign of the goddess—the *Ba'alat*, as the *Massêbah* was the sign of the *Ba'al* of the locality. This view has been greatly strengthened, according to Winckler, by the finding in the *Tell el Amarna* correspondence the name '*Ebed-ashêra* (slave of the Ashêra) where the word *ashêra* has the determinative sign signifying a divinity. The very name *Ashêrah* seems, then, to have been somewhat loosely used instead of the goddess' name *Ashtarte*. This mention of the name belongs to the period when we should judge the cult of *Ashtarte* and of the "grove" (*ashêrah*) to have been at its fullest development. At a later time, that of the Hebrew monarchy, the names appear to have been often used interchangeably (compare Judges ii, 13, x, 4; I Sam. vii, 4, with Judges iii, 7; I Kings xvi, 32; II Kings xxi, 3).

* In *Keilmshriften v. das A. T.*, 3rd ed., p. 276, on II Kings 21.

† Prof. G. R. Smith, *Expositor*, March, 1905, p. 231.

If these inferences are correct we can picture the chief elements of "Baal" worship in the pre-Israelitish times and later. It was a worship of a Ba'al—the owner or possessor of the locality—who among the Canaanites was specially the Ba'al who gave increase of the land and who thus came to be the god of fertility and to be connected with symbols of procreation. Side by side with this was the worship of the ba'alat, the proprietress of the place who all over the land was identified with Ashtarte, the goddess of fertility and reproduction. She, too, in the *Asherah*, at this stage was symbolised by emblems of the reproductive organs—as she certainly was on the terra-cotta plaques. In connection with these emblems we find the sacrifice of the "first born" [or at any rate of new-born infant,] buried at the foot of the *Massebah* probably when they were erected, human and animal sacrifices at the altar, and a system of religious prostitution, for which perhaps the cave under the Temple was adapted. This last we know to have accompanied this cult and evidences of it surviving to a late period are found in various passages in the Old Testament (*cf.* Amos ii, 7, Deut. xxiii, 18).

Accepting these views the language of Old Testament writers regarding the abominations of the "heathen" or the Canaanites will not appear too strong. G. F. Moore,* while by no means accepting all the above views, writes, "There is no doubt, however, that the cultus of Ashtarte was saturated with these abominations." How much of the religious process of the Israelites was one long struggle against the *Massebah* and *Ashérîm* is evident by a reference of their whole history down to their captivity. There was an *Asherah* at Samaria (II Kings xiii, 6), at Bethel (II Kings xxiii, 15), and even in the Temple at Jerusalem at one time (II Kings xxiii, 6). It by no means follows that the Israelites took on at once all the sanctuaries; in many cases in the first zeal of their invasion it is quite possible that many were destroyed, though, perhaps, in some cases restored; but at Gezer we have a special reason for accounting for the old *Massebôth* being allowed to remain undisturbed. We read (Josh. xvi, 10) that the Israelites did not turn out the Canaanites, but became amalgamated with them. But though the pillars stood, the Temple appears to have lost some of its ancient sanctity, for now at the stratum dated for this period we find the Temple area, previously so sacred, becoming built

* Art. "Ashtoreth," *Erc. Bib. Col.*, 338.

over by the dwellings of the people—doubtless greatly increased in number by the invasion of the Israelites.

There is another period of history when we might expect that the Temple would be destroyed; this is long years later, when the iconoclastic Simon Maccabæus captured the city from the Syrian general Bacchides. Why did he not then throw down the *Masgebôth*? The answer is simple. At his time almost all the pillars were covered with accumulated débris of many centuries of occupation. Only three could have been visible, and these three he, or someone at this time, threw down. Two have been broken up and only their bases remain; the third was found prostrate and has been re-erected—it is the phallic-looking number VIII.

There is another obscure but very interesting religious rite, traces of which have been found not only at Gezer but also in the Galilean “tells”—the foundation sacrifice. In the earliest times* infants were either buried in the walls or buried in jars† below the house foundations, specially the corners. In one case the body of an old woman, showing advanced rheumatic arthritis, was buried under a house corner—along with food vessels. But this is quite exceptional. At a later stage, specially in the fifth stratum at Gezer, which is probably the first city under Hebrew influence, we find the human victim replaced by a lamp. That is, instead of the sacrificed infant in a jar, we find lamps between bowls buried under the house walls. It would seem as if the lamp, in some way not apparent to us, represented the human victim.

The usual arrangement is a bowl above and one below and the lamp between, but, however arranged, the lamp is evidently the protected thing, and, as such, is placed centrally. Here, then, as in the other religious customs, we have an evolution in religious ideas. But though with the Hebrews the rite of foundation sacrifice became thus modified, yet it survived in places as late as the Monarchy. The story of Hiel the Bethelite is a case in point. He, in the days of Ahab, laid the foundations of Jericho (perhaps the fortifications only) at the cost of (the life of) Abiram, his first born, and set up the gates

* In the early Semitic strata at Gezer and *Ta'anuk*. At the latter places several adult foundation sacrifices were revealed. At *Tell Mutasellim* several infant remains in jars were found under the foundations of the earliest city walls.

† The use of fine jars and the insertion of other articles of pottery in the large jars with the infant remains make it clear that these are no mere murders but real sacrifices.

thereof at the cost of (the life of) Segub his youngest (1 Kings xvi, 34).

Mention must also be made of the two curious altars found at *Ta'anuk*. The first was a rock-cut altar for libations going back to about 2000 B.C., found at the bottom of the earliest stratum. The other is an extraordinary terra-cotta altar of incense found in fragments in the topmost stratum. It must date about 700 B.C. The altar has one "horn" surviving on the right side, and up its side alternately three animals with human heads and two lions; the paws of the lions rest on the heads below. The human heads are of a type analogous to very early Greek, and the altar is evidently a product of Hellenic influence if not an actual importation.

(b) The light thrown by the excavations on the condition of culture in Palestine in Old Testament times.

The excavations at Gezer show that that city had at least three independent walls at different periods. Of these the earliest was a rampart of earth faced inside and outside with stones; it was founded upon the original rock surface of the hill, the whole summit of which it enclosed. So primitive a work must have belonged to the earliest inhabitants; it represents a very low state of civilisation. With a good deal of confidence this structure may be assigned to a date earlier than 3000 B.C.

Inside this is a well-built wall enclosing the whole hill. It is much ruined, and in many places has been used as a quarry by later builders, but its original thickness must have been about 14 feet; it appears to have had long narrow towers of short projection at intervals of 90 feet on its course; the masonry, where unruined, is very good. At one point on the south side a massive brick gateway with a passage entrance 9 feet wide and 42 feet long was found. Two massive towers, about 28 feet long and standing still to the height of 16 feet, flanked the entrance. The passage way was paved with stones and a step at the inner end is still polished by the tread of feet. At the N.W. corner the remains of another gate—now much destroyed—were found. The southern gate affords important indications for dating this second wall. The great brick gateway after falling into ruins became covered with houses, and the new wall of the succeeding age was constructed further out. Now the stratum of city *above* the ruined gate can be certainly dated, because every datable object goes back to Amenhotep III.

of Egypt, *i.e.*, about 1500 B.C. This gate we may then conclude was, with the wall to which it belonged, ruined and useless at that time, and the depth of the strata makes it probable that it was constructed a thousand years earlier. This, then, is a most important historical fact, that the city of Gezer between 1500 and 2500 B.C. was a large and powerfully fortified city. If we may judge by the fine masonry work of the wall, the Gezer people must at that period have enjoyed a very considerable degree of civilisation. It may further be gathered from the remains that they were an agricultural people owning cows, sheep, goats, camels, and donkeys. The streets were narrow and crooked, and the houses had small rooms—little indeed but sleeping places, life during most of the year being passed in the open air, as with the *fellahin* to-day. Some of the larger rooms had roofs supported by wooden posts set on stone bases.* Many of these bases have been found *in situ* lying in a row down the centre of the room.

The third wall is by far the most important historically. It must have been built immediately after the destruction—probably by Thuthmosis III. of the second wall about 1500 B.C. It lasted down to about 100 B.C. Before it must have appeared the Khabiri when besieging the governor Yapahi, and through its gates passed the adventurer Lapaya.† Again, in the reign of Meremptah these walls saw and yielded to an enemy.‡ Here, too, came the children of Israel under Joshua, the governor of the city having been defeated and slain at Lachish (Joshua x, 33). Later on, a Pharaoh, having captured the city and slaughtered its inhabitants, presented its ruined walls to his daughter, the wife of Solomon, who re-fortified it (1 Kings ix, 16). Again, in later Jewish history, the walls are the scene of a siege. Bacchides, after having been defeated by Jonathan Maccabæus, fortified Gezer (Gazara) for a siege (1 Mac. ix, 53.) It was besieged, captured, and purified by Simon Maccabæus, who built himself a palace and re-settled the city with faithful Jews. What of all this long history may be traced in the remains of these long-buried walls?

Firstly, the walls are a curious patchwork of good and bad masonry. Only one gate on the south has been found, and that not so imposing as the great brick-gate of earlier times. There

* Perhaps its architectural feature may explain the last heroic feat of Samson (Judges xvi, 29). See Macalister, *Q. Stat. P.E.F.*, 1905, p. 196.

† Tell el Amarna Correspondence.

‡ "Gezer is taken," occurs on a stele of this monarch.

is no definite arrangement of the towers, thirty of which have been uncovered, all but two of which are later insertions of superior masonry; they join on to the wall by a straight joint going right through the wall. Evidently a section of the wall has been removed at these points, and the tower built in the cleared space. In the case of the two remaining towers the masonry is the same as the wall and is bonded into it. Near the west end of the north side, for a length of 150 feet, the masonry, though inferior to the towers, is of the same general character. It is reasonable to infer that the wall has for this length been breached by some hostile invader and afterwards repaired and strengthened.* Further, seven of the towers show later additions to their structure in the form of rough masonry with a sloping face covering their bases. Two of these towers are the important eastern corner towers, and the buttressing is clearly added to strengthen them, possibly against undermining. Mr. Macalister suggests that the great break in the wall 150 feet long and the other injuries to the wall requiring extensive repair were the result of Pharaoh's siege, and that, if so, the additional towers and the repaired break is Solomon's work. The hasty and incomplete additions of buttresses of rough masonry in the seven towers may, then, be the work of Bacchides, who commenced to strengthen the fortifications to resist the approaching army of Simon Maccabæus. This may be somewhat speculative, but of this we may be certain, that Gezer was a city with magnificent and imposing defences when the children of Israel came, and cities so defended—and there were many such—were not so inaptly described in Oriental language as "walled up to heaven" (Deut. i, 28). For tribes fresh from the desert like the Israelites, the capture of cities like Gezer was no small feat.

The fortifications of Megiddo at *Tell Mutasellim* have not been so exhaustively examined, but a great wall of sun-dried brick encompassing the whole hill, the lower courses of which have been exposed in many places, is considered by Dr. Schumacher to be the oldest wall and at least as ancient as the first masonry wall of Gezer. This must have been the fortification besieged by Thuthmosis III. of Egypt in 1480 B.C. (Petrie). The capture of Megiddo was a great event, recorded very fully in the annals of the King, and the magnificent plunder witnesses to what a height of civilisation the people of Syria had then attained. Indeed, Professor Petrie suggests† that it was the capture of so

* All these facts are from Macalister, *Q. Stat. P.E.F.*, Jan., 1905

† *History of Egypt*, vol. ii, p. 146.

many objects of art, and more particularly so many skilled workmen, which led to the great artistic development which arose in Egypt just after these military conquests.

The walls of Lachish (*Tell el Hesi*) were examined by Professor Petrie and Dr. Bliss, and though not followed round their whole circumference proved to have been no mean defences. The earliest wall was dated by Petrie as certainly before 1700 B.C., and probably it was considerably earlier. It was 16 feet thick, with massive towers of sun-dried brick. Above this were many re-buildings and repairs. We read that Rehoboam (II Chron. xi, 9) rebuilt and re-fortified Lachish, but there must have been many destructions and restorations in the stormy years that followed; the excavations show us that this was the case. At last came Sennacherib, who, as we learn from that wonderful bas-relief in the British Museum, captured and destroyed the city. Of this event there are abundant traces in the scattered rude buildings which, for a time, alone occupied the site. The walls were once again raised, probably by Manasseh (660 B.C.), to resist Egypt, but were finally overthrown (590 B.C.) by Nebuchadnezzar (Jer. xxxiv, 7), after which the site was left for two and a half millenniums to the wandering bedawin. More interesting than the walls, because much more definite in date, is the great layer of ashes, in places 5 feet thick, which, according to Petrie, represents the long desertion of the site between the arrival of the Israelites when, as we read in Josh. x, 32, "the Lord delivered Lachish into the hand of Israel, which took it on the second day and smote it with the edge of the sword and all the souls that were therein," and the rebuilding in the days of Rehoboam (II Chron. xi, 9). Everything found in these cities, Gezer, Megiddo, and Lachish, confirms what we know about them from the Scriptures, and the greatness of their walls and fortifications can only be described as astonishing.

Perhaps the most surprising and pregnant of facts which the excavations, especially those at Gezer, have revealed is the intimate connection which existed at an early period between Canaan and Egypt. The *Tell el Amarna* tablets have disclosed how close was the link during the XVIIIth dynasty, and we have abundant evidence for dynasties that followed, but this earlier connection belongs to the days of the mysterious Hyksos, or shepherd kings, who are supposed to have been themselves of Syrian origin. More Hyksos scarabs have been found than any others, and almost the last discovery made before the enforced closure of the work at Gezer was that of an Egyptian cave cemetery dating from the Middle Empire, say, about

2500 B.C. All the excavations point to the same conclusion—a prolonged and intimate connection between Palestine and Egypt. As to a North Arabian *Muzri*, about which so much has been written, no single archæological fact from Palestine can be brought forward to support this theory, which on geographical grounds alone appears so fantastic.

With regard to Babylonian influence, the discovery at *Tell el Hesi* of one tablet, which is really part of the *Tell el Amarna* correspondence, and the finding at *Tell Ta'anuk* a small library of other cuneiform tablets, consisting of communications between Palestinian towns at much the same period as the above mentioned correspondence, both witness to the wide diffusion of cuneiform writing, and to the once great predominance of Babylonia in the affairs of Canaan. The two cuneiform contract tablets found at Gezer, relating to the local sale of estates, can be absolutely dated to the years 651 and 649 B.C. through the names of the Assyrian Eponyms. They are witnesses to the unexpected degree of organisation of the government which Ashurbanipal had established in his recently conquered territory. With regard to DISCOVERIES THROWING LIGHT ON DEFINITE HISTORICAL EVENTS, reference has already been made to the sudden increase in the size of the population of Gezer at a time when from Bible facts we should date the arrival of the Israelites. At a later period it was found that there was a stratum of remains at Gezer in which the buildings by no means covered the whole area within the walls; in other words, the population of that period was much reduced. The date of this time, from the pottery and other remains, brings us to the time of Solomon or thereabouts, and the inference is that the reduction of the population was due to Pharaoh, his father-in-law, capturing the city and slaughtering the inhabitants.

The repairs of the walls in the Maccabean period have already been referred to, but a much more interesting and definite relique of that age is the great palace built by Simon (1 Macc. xiii, 43–53), the walls of which have been excavated. Although surmised to be this place when its massive walls were laid bare, the finding of an inscription made the surmise a certainty. This inscription was a rough graffito scrawled on the outer wall—

πάμπρα (ς) Σιμώνος κατεπάγη (?) π(ύρ) βασιλειον

which seems to mean "Pamphras, may he bring down (fire) on the palace of Simon." The words "Palace of Simon" are sure, so that the identity of the building is beyond question.

An inscription of a different character found on a jasper seal at *Tell Mutasellim* is exceedingly interesting; it may be the earliest Hebrew inscription of known date. In the centre of the seal is a lion, above and below which is an inscription which runs:—

לשמע
עבד ירבעם

“To Shamâ’ the servant of Jeroboam.” It is extremely probable that this Jeroboam was Jeroboam II., son of Joash, king of Israel, so that we have, what so far has been so lamentably rare, a Hebrew inscription contemporary with one of the Hebrew kings.

There is another source of inscriptions. This is the inscribed jar handles which have been found in increasing numbers in the excavations in South Palestine. These are in two languages, Hebrew and Greek. The latter, the more plentiful, belonged largely to Rhodian wine jars, and are of the Seleucidan period. Their variety is very great, but of no special interest to the Bible student. The Hebrew inscriptions occur in the strata of the later Hebrew occupation. The names occurring on them have long been a puzzle. One whole series of these handles are adorned with a sign generally accepted to be the flying scarabæus and with **למלך**—*le malek*—“to the king” above and a Hebrew name below. In the first two of these, found in the earlier Jerusalem excavations, twenty years ago, the names seemed to read *Zepha* and *Shat*, and it was supposed that they must be the names of some unknown kings in Palestine. Later on in the next excavations more names were found, but in this particular series—with the scarabæus and “to the king”—only the following four names, Ziph, Hebron, Shocoh and Memshat. (It need hardly be explained that the vowels are not expressed in the Hebrew, and are only guess-work.) Two theories were started to account for these names. Professor Sayce suggested that they were the names of towns in which were situated the royal potteries (three out of the four *were* identical with the names of known towns). M. Clermont-Ganneau on the other hand, thought that these jars were stamped with the names of the towns from which were paid taxes of oil, wine, etc., “to the king.” Against the first theory it may be urged that the earthenware of the jar handle is all of exactly the same kind, and does not show those varieties in composition which it certainly would if the jars were made at different places. Against the latter theory

is the fact that no other but these four names have been found.

Now, besides these specially stamped handles with "to the king" on them, a great many other jar handles with Hebrew names have been found, which names have from the first been taken to be (as with the Greek jar handles) those of the potters who made them. Why should not these others be the names of the *Royal* potters? After an exhaustive study of the genealogies in the early chapters of 1 Chronicles, Mr. Macalister comes to the conclusion that this is the case; he recovers all the four names of the "royal" potters, and connects them with 1 Chronicles iv, 23, when we read—

"These are the potters and those that dwell among plants and hedges (or in Netaim and Gederah); there they dwelt with the king for his work."

Not only do these names occur, but also most of the other names on the jar handles can be found in close connection in the Biblical genealogies. It is impossible to follow out here all the arguments and deductions which Mr. Macalister makes from these discoveries, but it is most interesting to find the same names in the contemporary pottery and in the Hebrew text of the Bible; thus it lends support to the older view, that the names in the genealogies are personal rather than place-names, and are taken from genuine contemporary records. It is an encouragement to hope for more discoveries which may illuminate difficult passages in the Bible.

During the period of time covered by the just mentioned excavations, a good deal of light has, from various sources, been thrown upon the problem of the ANCIENT TOPOGRAPHY OF JERUSALEM, resulting in a very general reversal of the views held a quarter of a century ago. Then it was practically unanimously admitted among students of the subject that Zion and the City of David occupied the summit of the western of the two parallel hills into which the site of the Holy City is naturally divided. Such a view seemed to have the support of Josephus, and certainly has all the weight of ecclesiastical tradition since the fourth century on its side. In recent years, and particularly in the last decade, almost all the leading scholars* have come to the conclusion that the original Zion

* Among the adherents of the new view may be mentioned, Birch, Stade, Robertson-Smith, Sir Ch. Wilson, Prof. G. A. Smith, Socin and Benzinger, Ryle, Bp. of Winchester, Canon Driver and Sir Ch. Warren.

and the City of David was upon the long narrow spur, usually called "Ophel," which runs south of the "Temple area" and terminates just above the "Virgin's fount," opposite the village of *Silwān* (Siloam). The arguments by which this newer view is maintained may be briefly reviewed under two headings: (1) Those from the site as compared with similar sites in Palestine, and (2) those from direct statements in the Bible.

(1) When Jerusalem first appears in secular history, under the name *Urusalem*, in the *Tell el Amarna* letters it is as a walled and fortified city, the chief town of a district and as a place which, it may be inferred, was of importance to the king of Egypt (Amenhotep IV.) to hold if he wished to retain the country. Indeed, in Letter II from *Urusalem* (Petrie's arrangement) the Governor Abd Khiba writes: "The King has set his name in *Urusalem* for ever, he cannot surrender his territory." This is interpreted by Winckler to mean that the King, who with his change of religion had assumed the name Akhen-aten (Glory of the sun disc), had made this city a shrine of Aten or the Sun-disc, and had in that sense placed his name and staked his reputation in the place. This is speculative, but it would be interesting if it could be proved that the one Egyptian creed which came nearest to monotheism should have been enshrined in the place from which the belief in one God went forth in a later age as a precious gift to the world.

More important for the present argument is the fact that in the before-mentioned correspondence are many references also to *Gazri* (Gezer) and to *Megidda* (Megiddo), and from them there can be no doubt that in this era both these cities were larger, better fortified, and more important than *Urusalem*. The hill on which the modern view now locates the original Zion and David's City is just the kind of hill which we find selected everywhere for fortified towns. Those who have visited the really ancient sites such as Gezer, Socho, Merashah, etc., will be at once struck with their similarity of the original site of "Zion." It was surrounded on three sides by deep valleys, and was almost without doubt separated by a depression from the higher hill to the north. The sides of the hill must in many parts have been perpendicular rocky scarps. At the foot near the southern extremity was the one true spring of *Jerusalem*, known in later times as *Gihon* and to-day as '*Ain umm ed deraj*' (the Spring of the Mother of the Steps) or "the Virgin's fount." The presence of the spring—for Judæa a very copious one—at the foot of this hill makes it certain that the original settlement must have been in the neighbourhood; it is inconceivable and

contrary to all we see in the land, that the first settlers could have established themselves on the western hill far away from the water supply. In spite of the suitability of the site, it is a difficulty to many that an area which now appears so small—it is to-day scarcely inhabited—could have been the locality of Zion. Here the recent excavations help us. Professor G. A. Smith has pointed out a wall surrounding the top of this hill "Ophel" would be from 3,800 to 3,900 feet long, whereas the length of the great outer defence of Gezer, now almost entirely recovered, is, according to the measurements of Mr. Macalister, but 4,500 feet. In other words, Zion might have been entirely restricted to this one hilltop and yet be nearly as large as the great fortress city of Gezer, which, as has been said, was considerably more important.

The main passages in the Old Testament which have a bearing on the position of Zion are those referring to the famous Siloam tunnel. This is the rudely constructed and winding rock-cut channel, 1,700 feet long, which conducts the water of the Virgin's Fount (Gihon) through the hill "Ophel" to the Pool of Siloam in the Tyropæan Valley. The famous "Siloam Inscription," describing how this work was completed, was found at its western end in 1880, but unfortunately it was undated. There can, however, be little doubt about the identity of this work with that described in II Ch. xxxii, 30, where it states the Hezekiah closed the issue of the waters of the Upper Gihon and "brought them straight down (or underneath) to the west of the City of David." From this it is clear that the tunnel passed underneath the City of David and came out on its west side. What clearer evidence could be given regarding the position of Zion?

There are other incidental references which strengthen this position. In II Chron. xxxii, 14, we read that Manasseh built a wall on the west side of "Gihon in the valley" of the Kidron, i.e., immediately above the fountain, and encompassed about "Ophel." Even stronger is the statement in Neh. iii, 15-16, when we read of the "stairs which go down from the City of David" in close connection with Siloam.

Zion appears to have been the old name for the same rocky height* which was afterwards called the City of David. "David took the stronghold of Zion; the same is the City of David." But while what had been called Zion was now renamed "City

* According to Prof. G. R. Smith (*Expositor*, Jan., 1905), the most probable meaning of Zion is a protuberance, shoulder or summit of a ridge.

of David," the old name gradually spread northwards as the city grew and "finally became synonymous with Jerusalem as a whole."* Thus in Solomon's time the name remained in its old locality. Solomon (I Kings viii, 1f) gathered together all the tribes to bring up the ark out of the City of David, which is Zion, to the Temple. The Temple at this stage lay above Zion, on the point which dominated the whole of this eastern ridge. The expression is always *up* from the City of David, or from Zion, to the Temple. David, for example (II Sam. xxiv, 18) went up from his house in his city to the threshing floor of Araunah—the site of the Temple.

But gradually the name Zion spread. It has been suggested that the "name accompanied the ark"† from the City of David to the Temple, and thence it spread to include the whole city, becoming a synonym for Jerusalem itself. In Isaiah's time the Temple Hill is clearly called Zion, and also in the writings of Amos, Micah and Jeremiah.

What the Western Hill was called in the Old Testament we do not know, but that the city spread early to it as the population increased may be considered certain. Professor G. A. Smith has shown how from many reasons the population of Jerusalem must have greatly increased soon after David took up his residence there, and we may suppose that suburbs under the shelter of the west walls sprang up in the Central Valley and also up the nearer slope of the west hill. The great building king, Solomon, crowned the summit of "Moriah" with the Temple and around it built his palaces.‡ They all together covered an area considerably smaller than the *Haram* in Jerusalem to-day. But he also built "the wall of Jerusalem round about" (I Kings iii, 31, etc.) It is very probable that Solomon built the "first wall" of the city,§ *i.e.*, a wall running on the line of the first wall described by Josephus. This ran from the "Temple area," where it must have joined a wall to protect the buildings there, due westwards to the site of the present Jaffa Gate; thence it ran south to the great rock scarp now included within the present "Bishop Gobat's boys' school," known as "Maudslay's Scarp." It has been argued that no king except Solomon could during all the monarchy have had

* G. A. Smith, *loc. cit.*

† "His own palace, that of the daughter of Pharaoh, the Throne Hall, the Pillared Hall, the House of the Palace of Lebanon," G. A. Smith, *Expositor*, Feb., 1905.

‡ Josephus, B.J., v, vi, 2.

the means to undertake this enormous work. From this point the excavations of Messrs. Bliss and Dickie* help us to pick up its course. From the Maudslay Scarp the ancient course of the wall can be followed as it passes north of the Anglo-German cemetery. Immediately to the east of this, Dr. Bliss excavated the base of a great tower, and on the east side found the wall running in two directions; in one direction the ruined foundations could be traced running north-east, in the other south-east. It is possible that the first of these was the line of Solomon's wall. It ran high up along the edge of the west hill towards the present ruined remains known as *Burj el Kebrît* and thence crossed the valley (El Wad) to the "City of David." The point of crossing *may* have been the Millo or "filling up" fortified by David.

If these conclusions are correct the fortifications of Jerusalem must have been more than doubled in length during Solomon's reign. As he had at his command the wealth of a large district, and workmen from far distant parts, there seems nothing against this; indeed it must be supposed that Jerusalem was left by Solomon extremely strongly protected for it to have held its own when in the next reign more than half the Hebrews severed themselves from her, and became her active enemies, a state of war which existed for sixty years.

The other line of wall, followed throughout by Bliss, after branching off at the point mentioned ran down the hill on the edge of the cliffs above *Wady er Rababi* (Valley of Hinnom) as far as the Pool of Siloam. Here it at one period apparently† surrounded the pool following the line of the rocky scarp, at another it crossed the valley by a great dam. The former line must have been the more primitive. From here traces were lost, but it is supposed that it ran along the edge of the Kidron valley, following the scarp visible at places, and was connected with the great piece of wall discovered by Sir Charles Warren running south-west from the south-east angle of the Temple area. The traces of foundations on the west hill clearly showed two distinct periods of construction. The first, the lower, Bliss supposes, belonged to some time in the later Jewish monarchy, the one nearer the surface would then be the wall of Nehemiah, which professedly followed the lines of the wall destroyed by Nebuchadnezzar. Unfortunately, nothing was found by which

* *Excavations at Jerusalem*, 1894-97, 98, by Bliss and Dickie.

† The scarped rocks along which it ran are visible, but all the stones have been removed because they lay unburied.

these remains could be positively dated. For want of information on the subject, it would be quite open to believe that Solomon himself constructed the wall on the wider lines running down to the Pool of Siloam, and that the other line of wall may have belonged to later times. The present writer considers the former theory the more probable. In addition to the walls Bliss found three gateways, one of which, a little south-west of the Pool of Siloam, clearly showed successive changes of level over three periods, each represented by a new door sill. In association with a Roman street running out here was a great rock-cut drain, 6 feet high, which shows that Jerusalem was not always the insanitary and ill-drained city it is to-day. The drain was Roman work, and may have been in use in New Testament times. During the progress of the excavations the ancient limits of the Pool of Siloam were defined. The original pool was found to have been a rock-cut excavation (71 feet north to south, and 75 feet east to west), and round the four sides there was a covered arcade (12 feet wide and $22\frac{1}{2}$ feet high), probably Herodian work; if so it was in use in New Testament times, and to this very arcade came the blind man (John ix, 7). On the west side of the pool a flight of stone steps was found which led up into the city, probably on the line of the very stairs mentioned in Neh. iii, 15.

There are many questions of Jerusalem topography yet unsolved. The south-east corner of the Temple which was so long pronounced with such positiveness to be Solomon's work, is now very generally considered Herodian; it was certainly built to admit of a great extension of the Temple area, and not the original limits. The exact course of the second and third walls is still a matter of dispute, and is hardly likely to be settled without excavation, but on the whole the opinion seems to be gaining ground that the present northern walls follow the general line of the third wall. The fact now demonstrated by Bliss's excavation, that the city extended so much further southwards than at present, makes it more believable than it once was, that the walls of the city at the time of the Crucifixion did exclude the area now covered by the "Church of the Holy Sepulchre." So good an authority as Sir Charles Wilson admits that there is nothing in the topography against the view; but whether the question will ever be cleared up on scientific evidence is doubtful.

Ancient inscriptions are unfortunately rare in Jerusalem on account of the softness of the local limestone and the destructiveness of man; one, therefore, which can be certainly dated and

refers to an historic character is of value. Such was a Greek inscription, with two words in Hebrew, on an ossuary box discovered recently in a complicated and extensive tomb on the Mount of Olives. The inscription records the name of the family whose bones had been stored there as that of "NICANOR, THE ALEXANDRIAN, WHO MADE THE GATES." M. Clermont Ganneau describes,* this discovery in its historical interest as "of the first rank," for he has proved that this Nicanor is the man who made the famous door in Herod's Temple known as the "Gate of Nicanor." This was probably the gate which, though it required twenty men to move it, is said to have spontaneously opened at midnight as a sign of the coming destruction of the city and Temple.† The gate was of Corinthian bronze covered with thick plates of gold and silver, and was 50 cubits high by 40 wide. The Talmud describes this Nicanor as of Alexandria.

Discoveries of the greatest interest are common in Palestine, and in recent years occur with augmented frequency, but they cannot all throw a *direct* light on the Bible history. It is tempting to dwell on the Mosaic map of Palestine found at Madeba, or to describe the marvellous Græco-Phœnician tombs found by Messrs. Peters and Thiersch at Maresha,‡ or to show how much may be learned from the recent German excavations at Baalbec and the Synagogues of Galilee, but time does not permit. It has been only possible here to briefly touch on a few of those subjects which have come under the writer's personal observation, and which appear to him fruitful in the illumination of the Holy Scriptures.

A hearty vote of thanks, on the motion of the CHAIRMAN, was passed to the author for his communication.

NOTE.—During the present spring three Societies have started work in Palestine under new firmans. Mr. Macalister, under the P.E.F., has resumed excavations in Gezer; Prof. Sellin, on behalf of an Austrian Society, is excavating Ancient Jericho; and Prof. Reissner is working at *Sebasteyeh*—ancient Samaria. Great results may be anticipated from the examinations of three such historic sites.

* *Q. Stat. P.E.F.*, 1903, p. 124.

† Joseph, B.J., vi, 5, 3.

‡ "Tombs at Marissa," *P.E.F.*

DISCUSSION.

Professor H. LANGHORNE ORCHARD.—This Society is to be congratulated on the contributions to archæological science brought before us by papers, in immediate succession, from such high authorities as Professor Sir William Ramsay and Dr. Masterman. It will be the hope of us all that the Palestine Exploration Society will obtain the firman* for which they have applied to enable them to continue their important work on Tell el Jezer.

We find that the more the statements of Holy Writ are honestly and carefully examined the greater is the illustration afforded of their reliability. To no thoughtful mind can it seem mere coincidence that whatever be the matter inquired into, whether place-situations and names, or the beliefs, works, and customs of peoples, the ascertained and final results of investigation are, always and invariably, attestations to the truth of the Bible; attestations that it is indeed the Word of God. As Professor Sir William Ramsay has pointed out, "in one detail after another the evidence of truth and minute accuracy accumulates."

J. D. CRACE, Esq.—As representing the Honorary Secretary to the Palestine Exploration Fund I am glad of the opportunity of expressing my thanks to Dr. Masterman for writing such an admirable summary of the results of the more recent explorations in Palestine, not only our own but those undertaken by other countries. These all are helpful to one another and afford valuable means of comparison. It is a pleasure to point out that the writer is a member of our own General Committee, and a frequent and valued contributor to the pages of our quarterly publication. Dr. Masterman's long residence in Palestine gives so acute an observer, who is also deeply interested in the subject, great opportunities of studying such local discoveries or accidents as serve to illustrate Bible history. His local observations have among other things extended to the meteorology of Palestine, and I observe that he remarks that the climate

* An announcement was afterwards made, by a representative of the Palestine Exploration Society, that the firman has now been obtained.

of Palestine is now as well known and *better understood* than our own. I am sure that most of the audience who have spent the last week in London will readily believe Dr. Masterman's assertions.

It should never be forgotten that the Palestine Exploration Fund was founded and exists for the purpose of discovering and recording facts—facts of all kinds which may prove useful to a more thorough knowledge of the country and its people, past and present, and which cannot but help to explain its history and those incidents of which it was the scene, as recorded in the Bible. It places the facts before the world to be made use of ; it does not, as a Society, attempt to apply them to the views of any one religious body. These facts have been gathered by able scientific men ; and in this meeting it is but gracious to remind you that one of these explorers was your own Secretary, Dr. Edward Hull, who made a Geological Survey of the country, recorded in a volume which forms a part of the great Survey Memoir.

Dr. Masterman has very ably brought together the results of recent discoveries which could otherwise only be found scattered among the records of the several societies in different languages, and I very cordially join in the vote of thanks to him for his paper.

HENRY PROCTOR, H.M.C.S., M.R.A.S.—I should like to add a few remarks to Dr. Masterman's paper on "Recent Discoveries in Palestine." In this excellent paper a good deal of fresh light is thrown on the religion of the early inhabitants of Palestine. We are already familiar with the fact of the almost universal prevalence of the worship of the heavenly bodies. It is clear that in Palestine, as in Egypt and Babylon, as well as among all the nations subject to them, the principal objects of worship were the sun and moon. But the most recent researches all tend to show that phallic worship was almost if not quite as universal as sun-worship. This throws a good deal of light on many passages of Scripture. For instance, if such was the religion of Sodom, we can scarcely wonder at the depravity and downfall of the Cities of the Plain, at the action of the daughters of Lot, and at the enticement of Israel into this kind of sin through the worship of Baal-Peor. Here too, we find a full and satisfactory reason for the great number of enactments against nameless sins in the Mosaic Law. This, no doubt, constituted what was most abhorrent to the God of Israel, in the worship of

Canaan, and the reason why every trace and symbol of their religion was ordered to be exterminated. Dr. Masterman clearly shows us that the worship of Baal and Ashtaroth was not merely that of the heavenly bodies, but also that of the phallus and yoni, just as certainly as was that of ancient Mexico and Peru.

All this tends to show the immense superiority of the religion of Israel over that of Babylon, and that of the nations of Canaan which they displaced, and furnishes a valid reason for the apparent severity of the commands for their utter extirpation, together with every symbol of their degrading worship.

MR. MARTIN L. ROUSE.—In this admirable paper we have the very clearest proofs that the Canaanites, as the Bible would lead us to suppose, were a numerous race, well acquainted with many arts of civilisation, when the Israelites invaded their land, and that they had, as the Bible specifically states, powerfully fortified cities; but that, as Holy Writ again declares, their morality and humanity were at the lowest ebb, their worship itself being full of licentiousness and murderous cruelty.

I would further ask whether the fact that the numerous "plaques" on which Ashtaroth is portrayed at Gezer are constantly found broken in twain does not point to a time when a God-fearing Israelite leader suppressed idolatry there?

As regards the length of the chronology before the Exodus, its figures are mainly based upon the supposition that the Hyksos kings held an undisputed sway in Egypt for five hundred years. But, as we know from the account of his royal ancestry given by Captain Aahmes in the reign of his namesake King Aahmes I., who overthrew the Hyksos, the so-called XVIIth dynasty reigned concurrently with them as more or less vassal kings: while the average of thirty-three years that Brugsch gives to the reigns that followed and to those said to have preceded the Hyksos, is proved in the following ones, and so may be inferred in the preceding, to be far too long; for the same Captain Aahmes records that he was a naval commander at the beginning of his namesake's reign, and yet mentions casually that he outlived that king and the two kings next after him.

Again I believe that the capture of Gezer by the Khabiri was one and the same thing with its capture by the Israelites, or, in other words, that the Khabiri of the Tell Amarna tablets are the Hebrews.

That "*Khabiri*," or more properly "*'Abiri*" (written with an initial *ayin*), is not equivalent to *Habiri* confederates, is clear enough, as Conder remarks, from the fact that the northern Amorites and Zidonians, who, as the tablets tell us, sided with the Hittites against Egyptian suzerainty in the north, are nowhere called *Habiri*, nor, on the other hand, are any of those northern confederates mentioned as joining with the *Khabiri* in the south, where alone these are mentioned as invaders. Moreover, the King of Jerusalem calls the *Khabiri* once "a race" and three times "a tribe" (Conder, *T.A. Tablets*, pp. 140, 144, 147, 148). He says that they have "fought all the lands that are at peace with him" (147), have seized all the land of which the Pharaoh is suzerain (145), and that they have destroyed all the rulers (142); he laments the recent withdrawal of Egyptian troops, asks why the *paka*, or Egyptian residents, "tremble before the chiefs of the *Khabiri*," and entreats his suzerain to send a fleet with fresh troops (145, 147); he speaks of a leader who bears an Israelite name, Ilimelec, as "cutting off all the king's land," and he says that "the king's land is rebelling to the chiefs of the *Khabiri*," instancing one city, Beth Baalatu, a name curiously like one of the cities of the Gibeonites (*Baalath*), which made peace with Joshua.* Finally this king writes on a tablet of different clay, "And truly we are quitting the city of Jerusalem," which reminds us that a king of that city, after Joshua's greatest battle, was found hiding in the cave of Makkedah. Was not this last letter, then, sent from this very retreat? The Bible represents a King Japhia as having also fought against Israel at that time, and the tablets include letters from Japhia, King of Gezer, wherein he beseeches the Pharaoh to deliver his region "from the power of the people of the desert lands." The Bible, it is true, styles Japhia King of Lachish; but it further tells how when Japhia had been killed in the cave and the Israelites presently attacked the city of Lachish, Horam, King of Gezer, came to its aid; which tends to show that there was a special tie between the two cities, and that Gezer had been a vassal town subject to Japhia also. One may add that another letter of about the same date states that the enemy had destroyed "thirty temples of the gods in a single month," which is just what the Hebrews would have done, but what

* Cp. Jos. ix, 17, xv, 9, 60; 1 Chr. xiii, 6, etc.

other invaders, especially other Canaanites, would not have dared to do.

The date of the letters from Jerusalem, Gezer, and Lachish is in the reign of Amenophis IV., or about 1450 B.C., which is just that of Joshua's invasion according to the ordinary Hebrew chronology, making the exodus about 1490 B.C. The more recent date adopted for the exodus in the reign of Mineptah has been utterly discredited through the finding of a record of this king, in which he speaks of invading Phœnicia and the land of Israel, and laying them both waste at the same time, thus proving that the Israelites had long been settled in Caanan, when he came to the throne.

ORDINARY GENERAL MEETING.*

REV. JOHN TUCKWELL, M.R.A.S., IN THE CHAIR.

The Minutes of the previous Meeting were read and confirmed.

ELECTION.—Dr. H. L. Underwood, Erzeroom, Turkey, was elected Missionary Associate.

The following paper was then read by the author :—

MENCIUS. By Rev. F. STORRS TURNER, B.A.

BORN one hundred and seven years after the death of Confucius, Mencius was the saviour of Confucian orthodoxy in an age when it seemed to be nearly extinguished by opposition and neglect. After ages, therefore, coupled together the names of the great master and his posthumous disciple as though they had been joint founders of the national religion. Strictly speaking, Confucius himself did not originate his doctrines; his function also was to defend, expound, and hand on the teachings of the wise and heroic kings of preceding ages, whose deeds and speeches were sung in the Chinese book of psalms and recorded in the histories. The origin of Chinese religion belongs to prehistoric times. Mencius is, comparatively speaking, a modern, rather than an ancient sage. He was the contemporary of Plato and Aristotle. He was born in 372 B.C. and died at the age of eighty-four in 288 B.C.

Rightly to appreciate the man and his work, we must have some knowledge of the land and the people to which he belonged. Moses, Zoroaster, Socrates lived in a world wherein great nations contended for supremacy, Egypt, Babylon, Persia, Greece. China, on the contrary, cut off from the Western world more effectively by the deserts and mountain ranges of Central Asia, than by the Eastern Ocean, was a world by itself, which had not

* Monday, May 27th, 1907.

the slightest knowledge of those remote regions. Three centuries later, when Buddhism entered China, these two isolated worlds began to hold intercourse; but in the time of Mencius, China with the regions occupied by savage races on her borders and the Eastern Sea were a world apart. And this China was but a fraction of the China of the present day; it extended about 1,000 miles from longitude 110° nearly to the Pacific coast; and some 700 or 800 miles north and south of the Yellow River. Peking, Shanghai, and Canton were outside Mencius's map of China. This region was divided into about a dozen large, and perhaps a hundred small states called kingdoms, dukedoms, and baronies. Politically, its condition was like that of Europe in the feudal age. War was the chief and best loved employment of the petty monarchs and nobles; who were practically independent, though nominally all subjects of the one and only sovereign, who by Divine right reigned over the whole world—not by virtue of fabulous descent from the gods, but selected on account of his merits to be ruler of all under heaven. Two such dynasties had passed away, Confucius and Mencius lived under the third, the Chow dynasty, which, however, in their time possessed only a small territory and was surrounded by larger states, nominally vassals, but really independent, and each of them aspiring to swallow up all the rest and achieve the throne of the world. War, then, was the life-work of all the governing classes. The nobles, riding in chariots, the common soldiers marching in ranks, armed with spears and bows, advanced to the sound of drums, and retreated when the gongs were struck. A winter campaign was in the natural order of things. Cities were walled round to resist sieges. But the people were civilised: they tilled the ground, bred horses, cattle and sheep, wove wool and silk; they had books and schools; they smelted metals and engraved jewels; they worshipped a Supreme Ruler, and spiritual beings animating mountains and rivers, and with these the spirits of their deceased parents and ancestors. In this feudal China, Confucius and after him Mencius, travelled from court to court teaching the doctrines of the ancient sages, and trying to win the kings and lords whom they visited to imitate the wise and benevolent monarchs of the past.

One remarkable difference between the careers of Confucius and Mencius is this—Confucius had no rivals, no opponents, never engaged in controversies. The historian, Sz-ma Ts'in relates a story of his meeting with Laou-Tsze, the founder of Taoism, at the Court of Chow; but the story is doubted. Whether it is true or not, there was no disputing; Laou-Tsze

was a mystic who made no effort to gain disciples, and he did not conceal his contempt for what seemed to him the vain efforts of Confucius to convert the world. On his part, Confucius, according to the story, treated Laou-Tsze with profound respect, though he did not understand him. Between the two men there was not any hostile feeling. Mencius, on the contrary, was a fighter all his life; and once one of his disciples said to him, "Master, the people all speak of you as being fond of disputing; I venture to ask whether it is so?" Mencius replied, "Indeed, I am not fond of disputing, but I am compelled to do it. I am alarmed by the spread of perverse teachings which delude the people."* Of these heretical sects some mention must be made presently.

Another difference between the two is that next to nothing is known of Mencius' personal appearance and character. The teachings of Confucius were written down by his disciples after his death, and these held him in such loving memory that they have described his ways of walking and lying in bed, his clothes and his food, going into details, telling us, for instance, that he always ate ginger at every meal. They descend to trivialities which provoke a smile. Mencius wrote down his own teachings, or superintended their compilation by his disciples. So in his case the man is almost lost sight of; we have to be content with ignorance of his personality, with one exception; the man who could speak so plainly and faithfully to kings and nobles had the courage of a martyr, although, as it happened, he was never in danger of his life, as Confucius was, at least once.

The teaching of Confucius is summed up in the Five Virtues—Love, Justice, Propriety, Knowledge, Fidelity; and in the Five Relationships, Prince and Minister, Father and Son, Elder and Younger Brother, Husband and Wife, Friend and Friend. Mencius, no doubt, accepted all of these. To him, as to all Chinese, they were axiomatic; so certain that it was quite unnecessary to assert belief in them. This makes the difference between the teachings of the master and his successor the more striking. Mencius hardly ever draws attention to the last three virtues, while he incessantly insists upon the first two. From the first chapter of his book to the last, Love and Justice are his watchwords. If we do not fall into the mistake of attributing to him a Christian concept of the Fatherhood of God, we might say that his life-long motto

* Legge's *Chinese Classics*, vol. ii, pp. 154-160.

was *Ye cannot serve God and Mammon*. "You have come so far to see me," said King Wei to him, "surely you bring some plan with you by which my kingdom will gain?" The philosopher replied, "I bring Love and Justice; why need your Majesty utter that word, Gain?"* In the course of several interviews with this and other rulers, Mencius' one aim was to get them to see that not gain-seeking but the practice of Love and Justice was the only road to safety, to conquests, to attaining universal supremacy. The third virtue, Propriety, or Politeness, and the fourth, Knowledge, or Wisdom, are frequently mentioned, but rather as developments or manifestations of the first two than as co-ordinate cardinal principles. There is a fourfold description of human goodness which Mencius frequently employs. The fifth virtue, Truthfulness, or Fidelity, is not overlooked, but is referred to as meaning the reality or sincerity of the preceding four. Mencius is ever falling back on Love and Justice as the fundamental and all-embracing virtues.

We shall fail to do justice to Mencius if we omit to mention what may be called his special doctrine, the original and inherent *goodness of human nature*. This is not a new discovery, it is the text of the Chung Yung, or Doctrine of the Mean. But Mencius laid special stress upon it, and in that way made it his own. This doctrine, on first hearing, may seem a denial, not only of Bible teaching, but of the universal confession of sin, which is directly or indirectly found in all ages and among all races of mankind. Such a view, however, could only be maintained by one ignorant of Mencius' real meaning. He, no less than Confucius, was deeply convinced of the Fall of Man from his nature as given by Heaven, that is, by God. Indeed, it is just on purpose to convince men of their moral lapse that Mencius labours to call up within them that inward sense of the good and the right, which is the true nature of man as it ought to be. Perhaps the best way to grasp the Mencian doctrine is to listen to his discussions with the great heretics, Yang and Mih.

"Yang's principle," Mencius tells us, "was 'Every man for himself,' that is, pure egoism; if he could have benefited the whole world by plucking out one hair from his head he would have refused to do it."† From the fragments of Yang's teaching this is a harsh, but not an incorrect description of Yang's views, which were worse than negatively immoral. In

* Legge's *Classics*, vol. ii, p. 1.

† pp. 158, 340.

forceful language he describes the hardships and sorrows which the pursuit of virtue and the welfare of others entails, adducing the great saints of China, Shun, Yu, Chow-Kung and Confucius as examples. On the other hand, he sets forth in glowing terms the riches, power, and sensual indulgences which the two most wicked sovereigns in Chinese story enjoyed, and gives his commendation to the careers of the successful monsters of vice and crime. At the best his teaching may be summed up in the suggestion, "Let us eat and drink, for to-morrow we die"; but it seems to go further and say, "Stick to nothing to gratify your desires, only do not miss your mark." Against such a doctrine Mencius had only to appeal to the witness of the human conscience, even as the apostle Paul pointed out, that the heathen who had no knowledge of the law of Moses, yet had the law of right and wrong in their own hearts. It was in this sense that he maintained the goodness of human nature. Some people have said of Confucian teaching that it is nothing but morality; it is not religion; and this seemed to imply that this moral sense is of slight value, and its maintenance and development of no great moment. But when they hear the vile and horrible tenets of this Chinese advocate of selfishness and vice, will they continue of the same opinion? For myself, I rejoiced greatly when I first became acquainted with the high and pure morality of Confucius and Mencius, and frequently quoted their best sayings when preaching to the Chinese; but now looking back, I am afraid I did not then sufficiently esteem these great teachers of morality, nor rate highly enough the good influence they have exercised over so many generations of their countrymen. When one tries to imagine what China would have become had the teachings of Yang prevailed over those of Confucius, we can realise the incalculable blessing which the "mere morality" of the sages has been to its people. Not that I admit the mere morality: I shall presently show you that Confucianism is a religion as well as an ethic.

From Yang, the advocate of unscrupulous selfishness, we turn to the other extreme, Mih, the apostle of universal love and self-sacrifice. "The philosopher, Mih," says Mencius, "loves all equally. If, by rubbing smooth his whole body from crown to heel he could have benefited the world, he would have done it."* The loss of one's hairs to save the world seems a small sacrifice, but we must understand, I suppose, that this rubbing off was to be the result of life-long toil for the public

* p. 340.

good, like that of Yu on the Yellow River to prevent inundations. At first sight Mih's doctrine seems quite Christian. Mencius objects, not to the self-sacrifice, but to the loving all equally. His objection is like that afterwards, and to-day, brought against Buddhism—it acknowledges the claims of neither king nor parent. It is only fair to Mih to point out that he does not in so many words assert that the love given to all men was to be without difference of degree;* and this has been recognised by great Chinese scholars.† Nevertheless, the language of Mih is not sufficiently explicit, and the interpretation given to it by Mencius may well have been that which was actually accepted by the Mihist sect. Not to love one's own parents more than another man's parents, one's own wife than his wife, one's own children than his people, is a precept which evidently would serve as an excuse for the neglect of moral obligations, and open the door to evil. It reminds one of the Jewish rabbi's teaching about Corban, whereby discharge of duty to God was made a justification for not fulfilling duty to parents. There was a third philosopher, one Tsze-moh, who contended for a medium view between the opposite teachings of Yang and Mih; exactly what this mean between the extremes was, Mencius does not tell us; perhaps it was something like Herbert Spencer's contention that egoism and altruism are both right and both obligatory. But Mencius, while admitting that Tsze-moh came nearer to the right, regarded his view as narrow-minded, because it left no room for adapting conduct to the exigency of circumstances.‡

Mencius opposed these heresies by asserting his great doctrine that human nature is good, and contains within itself a safe guide to right conduct. He unfolds this fundamental truth in a chapter which I will abridge to the utmost possible. Mencius said, "All men have a mind which cannot bear to see the sufferings of others My meaning may be illustrated thus:—if men suddenly see a child about to fall into a well they will without exception feel alarm and distress, not as a ground on which they may gain the favour of the child's parents, nor as a ground on which they may seek praise, nor from fear of blame if they show callousness. From this case we may perceive that the feeling of pity is essential to man, that the feeling of shame is essential to man, that the feeling of self-surrender is essential to man, that the feeling of right and wrong is essential to man. The first feeling is the origin of love, the second is the origin of

* p. 132.

† p. 133.

‡ p. 341.

justice, the third is the origin of propriety, the fourth is the origin of the knowledge of morality. Men have these four principles just as they have their four limbs. If only they allow them to develop, it will be like the kindling of fire or the bursting forth of a fountain. Fully developed, these four principles will suffice for the protection of all mankind; if they are not allowed to develop, a man will not even discharge his duty to his father and mother.”*

Add to this another, but this time a short chapter. Mencius said, “One’s own self contains everything. To examine one’s own personality with sincerity is the greatest possible joy. Striving to fulfil the law of loving one’s neighbour as oneself is our nearest approach to the attainment of love.”† Again, “Honour virtue and delight in justice, so you may be perfectly satisfied.” The following quaint illustration is forcible, as it is amusing: Mencius said, “I like fish and I also like bear’s paws. If I cannot have both, I let the fish go and take the bear’s paws. Life I like, and justice I like; if I cannot have both, I will give up life and keep justice. I wish to live, but there is something which I desire more than life, therefore I will not save my life in wrong ways. Death I hate, but there is something I hate worse than death, therefore there are occasions when I will not avoid danger.”‡ This reminds us of the Elizabethan song,

“I could not love thee, dear, so well,
Loved I not honour more.”

“All men,” said Mencius, “have this mental nature.”

Besides these two notable heretics, Yang and Mih, Mencius encountered other opponents. The philosopher Kaou disagreed with his belief in the goodness of human nature. Kaou held that man is naturally neither good nor bad, but can with equal ease be turned, or turn himself, in either direction. Human nature, in his view, was like willow-wood, out of which either a cup or a bowl can be made. Mencius pointed out that “before you can make a cup or bowl you must injure the willow-tree. Must you injure and do violence to men in order to make them loving and just? Your words would lead men to regard love and justice as calamities.” “Man’s nature,” said Kaou, “is like water flowing down; open a channel for it to the east, and it will flow to the east; open a channel to the west, it will flow to the west. Man’s nature is indifferent to good and evil, just as

* F. 77.

† p. 327.

‡ p. 287.

the water is indifferent to east and west." But Mencius retorted, "Will water flow indifferently up or down? Man's nature tends to goodness, as water tends to flow downwards."* One of Mencius' disciples objected: "Some say that man's nature may be made to practise good or to practise evil, as under the good Kings Wan and Woo they loved what is good, and under the bad Kings Yeu and Le they loved cruelty. Others say that the nature of some is good, and the nature of others is evil. Hence under the saintly Kings Yaou and Shun there were bad men like Seang and Koo-Sou; while the tyrant Chow had good relatives and ministers. And now you say, 'The nature is good.' Are all these wrong?" Mencius replied, "From the feelings proper to it, it is constituted for the practice of what is good: this is what I mean by saying that the nature is good. If men do what is not good, the blame cannot be imputed to their natural capacity."† Then he reiterated his assertion of the natural feelings of pity, shame, reverence, and conscience.‡ After we have heard all that Mencius had to say, we cannot feel satisfied. That man is made to be good, that he knows his duty, that he can choose the right and reject the wrong, Mencius affirms repeatedly. He also admits that most men are overcome by circumstances and bad examples. Yet he insists that to make the right choice is as easy as turning the palm of the hand upwards, or lifting a feather. He perceives the *ideal* of human nature, he maintains the categorical imperative of duty; he does not, like St. Paul, confess the inward struggle, "the good that I would I do not, but the evil which I would not that I do . . . with the mind I myself serve the law of God, but with the flesh the law of sin." Mencius is a teacher of the moral law, but he has no gospel to proclaim.

We have now to consider the question whether Confucianism is mere morality or a true religion. The religion of the Chinese, it has been said, is ancestor-worship. Little support can be found for this in Mencius. He is a good Confucianist, and on one occasion he quoted the precept about sacrificing to a deceased father, but the context shows that this sacrifice was intended to be a sign of the sincerity of the son's love and sorrow. Sacrifices to Heaven are several times mentioned. But the main fact is that Mencius, in accordance with Confucian teaching, ascribed the law of duty in man's heart to Heaven's implanting it there. The *nature* is what Heaven ordains. Mencius did not base morality upon utility; he did not say right conduct is

* p. 271.

† p. 278.

conduct which brings advantages; he did not try to discover rules of conduct by calculation of consequences. He recognised divine causation in the human sense of moral law, adducing the book of history which says, "Heaven having produced the inferior people, appointed for them rulers and teachers, saying, 'Let these be God's helpers.'" He himself encouraged the penitent to worship, saying, "Though a man may be wicked, yet if he adjust his thoughts, fast, and bathe, he may sacrifice to God."* And again, "Misery and happiness in all cases are brought about by ourselves; the Book of Odes says, 'Be always studious to be in harmony with the ordinances, so you will get for yourself much happiness,'"[†] and again, "When Heaven sends calamities, it may be possible to escape; when we bring calamities upon ourselves, it is impossible any longer to live."[‡] These frequent references to God and to Heaven as the Supreme Ruler of the world seem to me to justify the assertion that the teachings of Confucius and Mencius are the outcome of a genuinely religious belief. Perhaps the reflection which Mencius makes, after noticing the humble origin of men who afterwards rose to sovereignty and to high offices, is not the least instance of this. "When Heaven is about to confer a great office on any man, it first exercises his mind with suffering, and his sinews and bones with toil. It exposes his body to hunger, and subjects him to poverty. It confounds his enterprises. By these experiences it stimulates his mind, hardens his nature, and supplies his deficiencies."[§]

I said at first that we have no description of Mencius's personality, except what we can gather from his teaching. But after examination of this we do learn something of him. He was a man of tact, a good reasoner, and not lacking in courage. When he wished to persuade a king or duke to good government, he began by pointing out some quality in the man which would respond to his appeal. King Wei asked him, "Can such a man as I am become a benevolent ruler?" "Yes," said Mencius. "How do you know that?" asked the King. "I heard a story about you," said Mencius. "You saw a man leading an ox past your hall and inquired, 'Where is the ox going?' The man replied, 'We are going to consecrate a bell with its blood.' You pitied it, because it looked like an innocent person going to execution. 'Let it go,' you said. The man answered, 'Shall we omit the consecration of the bell?' You said, 'Take a sheep instead.'" From this incident Mencius convinced the

* p. 206.

† p. 74.

‡ p. 75.

§ p. 323.

King that he had a pitiful heart; and thus could pity the miseries of his people who were dying of hunger. But he did not stop there. He asked the King, "Is there any difference between killing a man with a stick or a sword?" "No," said the King. "Is there any difference between killing him with a sword, or by bad government?" "No." "In your kitchen," said Mencius, "there is fat meat; in your stables there are fat horses. But your people have the look of hunger, and on the wilds there are those who have died of famine. This is leading on beasts to devour men."* It must have required courage to tell one of those fighting despots that he was murdering his people. Another occasion called forth a still more conspicuous illustration of fearless truth-speaking. The King of Ts'e asked Mencius about the duties of the chief ministers. "If the King has great faults," Mencius answered, "and his chief ministers are his relatives, they ought to remonstrate with him, and if he does not listen to them, after repetition of the remonstrance, they ought to dethrone him." No wonder that the King changed countenance; but Mencius said, "Do not think it strange, your majesty. You put a question to me and I dared not give other than a true answer."† That he was not clapped into prison, nor expelled the country shows the great respect felt in those times for wise and faithful advisers. The princes of the Middle Kingdom could not bring themselves to place government in his hands; but they treated him as an honoured guest and rewarded him richly.

Mencius was at heart a democrat: the rulers, whether dukes or princes or kings, in his opinion existed for the people, and were only justified by the well-being of the people. "The people," he said, "are the most important element in the state; the spirits of the land and grain are the next; the sovereign is the least important When a prince endangers the altars of the spirits of the land and grain, he is deposed and another is appointed. When the sacrifices have been duly offered, if there comes drought or inundation the spirits of the land and grain are deposed and others appointed in their place."‡ This treatment of the inferior divinities as merely the servants of mankind is to us a strange notion, but it accords with Chinese ideas. The emperor will decree such changes in the spirit-world, and in Chinese belief, Heaven, the Supreme Ruler, also judges emperors and rulers by results. If the people do

* p. 9.

† p. 268.

‡ p. 360.

not enjoy peace and prosperity, then by Heaven's decree, the dynasty is changed.

But with this immense respect for the people, Mencius was not an anarchist. There were anarchists in China then. We read that one Heu Hing with some scores of followers came to a little kingdom where Mencius was which for the time had a good prince. He asked and received a grant of land, and his example was followed by other immigrants. But the newcomers were not content. Heu Hing complained. "The prince of Tang is indeed a worthy prince, but nevertheless he has not heard the true doctrine. Good princes should themselves till the soil along with their people, and should cook their own food, as well as carry on the government. But the prince of Tang has his granaries, and arsenals, and treasuries; that is, he oppresses the people to feed himself. "Now can he be thought a good prince?" Mencius said, "I suppose Heu Hing sows and eats the produce." "Yes," they said. "I suppose he weaves and wears his own cloth. Is it so?" "No. He gets it in exchange for grain." "Why does not Heu weave it himself?" "That would interfere with his farm-work." "Does he make the iron pot in which he cooks his food, and his plough-share?" "No, he gets them in exchange for his grain." The business of the handicraftsman can by no means be carried on along with the business of husbandry." Mencius retorted, "Is the government of the empire the only business which can be carried on along with the practice of husbandry" There is the proverb, Some labour with their minds and some with their muscles. Those who labour with their minds govern those who labour with their muscles, and those who labour with their muscles provide food for their governors. This holds good everywhere.*

Some people imagine that China is a stereotyped country always looking back to the past, never progressing, never even desiring progress. But the China of the time of Mencius was evidently fermenting and in process of evolution. So it has been ever since, and is at this day, when the new leaven of Christian truth has entered its mass, and already works mightily there, soon we may hope to leaven the whole lump. We English and other Europeans are very ignorant of Chinese history and of the living Chinese. If we knew them better we should esteem them more highly. They have not been a God-forsaken race until we found the way to their shores. The

* pp. 123, 125.

only great race and empire which has maintained itself for thousands of years, while Egypt, Babylon, Persia, Greece and Rome fell into decay and passed away; we may well pause and wonder for what destiny this great, civilised, industrious people has been preserved until now. It were well if we had practised towards them the love and the justice which Mencius regarded as Heaven's ordinance for all mankind. Unhappily Christian nations have gravely wronged China in the past. It is time for us seriously to consider the claims of China to just treatment, and to atone as far as possible for the wars and oppression she has suffered at our hands. And to get into this wholesome state of mind, we must reflect that in every nation he that feareth God and worketh righteousness is acceptable to Him." "He made of one every nation of men for to dwell on all the face of the earth, having determined their appointed seasons, and the bounds of their habitation"; and surely there is a divine purpose in the events which have brought four hundred millions of Chinese into practical relations with Europe and America not for the Chinese only, but also for the western world, which cannot but be greatly affected by the conjunction. The future we cannot foresee; to do justice and love mercy to all men is our best preparation for whatever destiny lies before us.

The CHAIRMAN, in conveying the thanks of the Meeting to the author for his interesting paper, invited discussion.

DISCUSSION.

Professor ORCHARD.—We are indebted to the author of this interesting paper for making us better acquainted with one of China's great men, a man who to uprightness of character united intellectual acumen.

I was struck by what Mencius says (toward the end of the paper) concerning "the spirits of the land and grain": "When the sacrifices have been duly offered," i.e., when the people have

performed their religious obligations, "if there comes drought or inundation, the spirits of the land and grain are deposed and others appointed in their place." Presumably this is done by the Supreme Ruler. The idea that God has set angels over various provinces of nature and holds them responsible for the way in which they execute their office, seems to receive some support from the eighty-second Psalm, where rulers bearing the appellation of "gods" are rebuked for abuse of their position.

That Mencius could assert the doing of right to be quite easy shows that his knowledge of human nature was more theoretical than practical. Evidently he permitted his theory to blind his eyes.

The greatest service rendered by him to mankind was that he stood for Will-freedom and the Divine supremacy of Conscience, and thus for Absolute Morality. Herein lies his chief claim to admiration and gratitude.

We shall agree with the author that we are debtors to the countrymen of Mencius. "Unhappily Christian nations have gravely wronged China in the past." Let our present action be to set forth that Gospel of which Confucius and Mencius were ignorant. Let us tell the Chinese, as they feel after God, if haply they may find Him, that He is Spirit, that He is Light, that He is Love, and is not far from every one of them. Let us tell them that He has come to man, to redeem and save and bless him through the atonement and resurrection of His Son, Jesus Christ our Lord.

Rev. JAMES THOMAS (Secretary, British and Foreign Bible Society).—I rise to express my deep sense of obligation to the reader of the paper, who has brought before us, within a narrow compass, the important teaching of one of China's greatest men. It was not an easy task which the writer of the paper set before himself. Those who have listened to it are very liable to conclude that because it is so exceedingly clear and apparently so simple that the task had few, if any, difficulties. Whereas, on the contrary, the subject in itself is not at all easy.

We have been given a picture of the condition of China in the days of Mencius, and we have had represented the task which that great sage set before himself. Primarily he sought to be a reformer of kings and rulers, but the plans he pursued have enabled us very

clearly to trace the doctrines he held and his methods of applying them. I will not refer to his political doctrines, or the methods he followed in his endeavour to reform rulers and courts, but his doctrine of God is remarkable. The books which Confucius edited and passed on, the great books which commonly bear his name, were not, as is well known, written by him. These same books, which Mencius made the foundation of his teaching, were pervaded with high monotheism. Indeed, China presents a striking illustration of the falsity of that teaching so rife in modern days that the religious condition of ancient men was that of fetishism or polytheism. China to-day abounds in idols, but the idolatry we see there is a degradation and a debasement of the conception of God which is found in all the ancient literature of the land. All the great attributes of the Jehovah of the Old Testament are found to be the attributes of Shang-ti, the Supreme Ruler of ancient China.

Mencius' doctrine of man has also been very clearly set forth in the paper. The reader of the writings of Mencius would conclude that the Ideal Man was one who dwelt in love, who lived with propriety, who walked in righteousness, who, when he rose to office, practised his principles for the people's good, but, if disappointed in reaching office, practised his principles for himself alone. He was one who could not be led by riches and honour into a life of dissipation, and who could not be made to swerve from the right by poverty or low estate: one who could not even be forced by want from the qualities of greatness; he was an Ideal Man. The nature of man he held to be good; the tendencies of man's nature were towards goodness; the constituents of his nature were benevolence, righteousness, propriety and wisdom. Men have these four principles just as they have four limbs. But the writer of the paper has shown us that if we interpret these things naturally and literally we misunderstand the teaching of Mencius, just as in our own day if we interpret the doctrine of "total depravity" literally it would be contradicted by common-sense; for if men were totally depraved they could not possibly get worse and worse. What is really meant by the doctrine is that there is not a single faculty of man's nature or power of his mind which has not been exercised in wrong-doing, so that in this sense his nature is totally depraved; and Mencius was only

too conscious of the fact that men did not live in accordance with what he set forth as the principles of human nature. The writer of the paper has shown with great clearness what the doctrine of Mencius is, and I wish most sincerely to thank him and to congratulate ourselves on having heard a paper which few could have prepared.

OBITUARY NOTICE.

THE LATE MR. R. DENNY URLIN.

AMONGST the more distinguished of our Associates who have passed from amongst us during the past year is Richard Denny Urlin, F.S.S. Born at Westminster in 1830, he claimed descent from a Huguenot family which left France before the edict of Nantes was revoked. He was for a short time at the old Charterhouse School, then in the heart of London, and afterwards at University College School, Gower Street.

Becoming a student of the Middle Temple, Mr. Urlin gained the third place in the Voluntary Examination for Honours, at the early age of nineteen, and in consequence was offered an appointment in the newly-formed Court of the Encumbered Estates of Ireland. In 1858, this court became by Statute, the Landed Estates Court, and Mr. Urlin was appointed one of its chief officers, in which position he remained until 1876, when he retired from the public service. Having been elected in 1882 a member of the London School Board for the Chelsea division, he devoted most of his time for the next three years to the arduous duties of this position, as one of an active minority who sought to promote economy and to defend the Voluntary Schools; and in retiring from the Board in 1885, he had the satisfaction of seeing a majority of members returned who were pledged to those principles. He was the author of several legal works, but the most successful of his books has been a *Life of Wesley*, written for the S.P.C.K., which has circulated largely in England and the Colonies.

One of Mr. Urlin's daughters is the wife of Professor Flinders Petrie; whose companion and help-mate she has been during her husband's explorations in Egypt and Sinai, sharing all his dangers and hardships, as well as his honours.

E. H.



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- 1889*¶Pinches, Theo. G. Esq. LL.D. 38, *Blomfield Road, Maida Hill, W.*
- 1878 ¶Rassam, Hormuzd, Esq. F.R.G.S. 30, *Westbourne Villas, Hove, Brighton.*
- 1889 ¶Sayce, Rev. Prof. A. H. M.A. LL.D. Fellow and Tutor Queen's Coll. Oxford.
- 1899 Turner, Sir William, V.D. M.B. LL.D. D.C.L. D.Sc. F.R.S. Prof. Anatomy, Univ. Edin. 6, *Eton Terrace, Edinburgh.*
- 1902 ¶Wilson, Maj.-General Sir Charles W. R.E. K.C.M.G. F.R.S.
- 1905 Woodward, Dr. Henry F.R.S. F.G.S. 129, *Beaufort Street, Chelsea.*

FOREIGN.

- 1895 HIS MAJESTY KING MOMOLU MASSAQUOI, West Africa.
- 1881 Abbe, Professor Cleveland, M.A. Assistant in the office of the Chief Signal Officer of the Weather Bureau, U.S.A.
- 1888 Agassiz, Alexander, Esq. D.C.L. Prof. of Comp. Zoology, Cambridge, Mass. U.S.A.

- 1894 Dawson, G. M. Esq. C.M.G. LL.D. D.Sc. F.G.S. A.R.S.M.
F.R.S.C. Asst. Direc. Geolog. Survey of Canada,
Sussex Street, Ottawa, Canada.
- 1895 Hilprecht, Rev. Professor H. V. D.D. *Univ. of Pennsylvania, U.S.A.*
- 1893 Hommel, Prof. Fritz, Ph.D. LL.D. Prof. of Semitic
Languages in Univ. of Munich, *Leopolds Strasse 81 Munich.*
- 1889 d'Hulst, Count Riamo, *Cairo.*
- 1895 Lugard, Brigadier-General F. J. D. C.B. D.S.O.
- 1896 ¶ Macloskie, Prof. G. D.Sc. LL.D. Prof. Biology (Princeton),
U.S.A.
- 1883 ¶ Maspero, Prof. G. D.C.L. *Collège de France, Cairo, Egypt ;*
24, Avenue de l'Observatoire, Paris.
- 1904 Nansen, Prof. Fridtjof, D.Sc. LL.D. D.C.L. *Lysaker, Norway.*
- 1893 ¶ Naville, E. D.Lit. Ph.D. *Malagny, Geneva, Switzerland.*
- 1895 Sabatier, Professor Armand, M.D. *Montpellier, France.*
- 1898 Stosch, Rev. Prof. D.D. 24, *Lutzow Street, Berlin.*
- 1904 ¶ Upham, Warren, Esq. M.A. F.G.S. Amer. Sec. Minnesota
Historical Society.
- 1898 Zahn, Rev. Prof. T. H. *Erlangen.*

SPECIAL.

- 1872 Abraham, Rt. Rev. Bishop, D.D. *The Close, Lichfield.*
- 1889 ALGOMA, Right Rev. E. Sullivan, D.D. D.C.L. Bishop of.
- 1878 AUCLAND, The Most Rev. W. G. Cowie, D.D. Bishop of.
- 1883 Beckwith, The Right Rev. J. W. D.D. *U.S.A.*
- 1890 Dover, Right Rev. G. R. Eden, D.D. Bishop of.
- 1878 Fredericton, The Most Rev. the Lord Bishop of.
- 1878 Haïti, The Right Rev. J. T. Holly, D.D. Bishop of, *Port-au-Prince, Haïti.*
- 1884 Herzog, Right Rev. E. D.D. Bishop of the Old Catholic
Ch. of Switzerland, *Berne.*
- 1878 Jaggard, Right Rev. Bishop T. A. D.D. Bishop of S. Ohio,
Episcopal Rooms, Cincinnati, Ohio, U.S.A.
- 1892 Lucknow, Right Rev. A. Clifford, D.D. Bishop of, *Allahabad,*
India.
- 1886 Mylne, Right Rev. L. G. D.D. *St. Mary's Vicarage,*
Marlborough, Wilts.
- 1888 North China, Right Rev. C. P. Scott, Bishop of, *Cheefoo,*
North China.
- *1890 Ottawa, Right Rev. C. Hamilton, D.D. D.C.L. Bishop of.
- 1878 Staley, The Right Reverend T. Nettleship, D.D. late
Bishop of Honolulu, formerly Fellow of Queens'
College, Camb. *Crozall Rectory, Lichfield.*
- 1886 Truro, The Right Rev. J. Gott, D.D. Lord Bishop of.
- 1880 Vail, Right Rev. T. H. D.D. Bishop, *U.S.A.*
- 1878 Victoria, The Right Rev. J. S. Burdon, D.D. Bishop of,
St. Paul's College, Hong Kong (care of Dickeson &
Stewart, 4, Queen Victoria Street, E.C.).

HON. CORRESPONDENTS.

- Anderson, J. F. Esq. F.R.G.S. *Melrose, Curepipe, Mauritius.*
 Baker, Rev. W. M.A. 40, *Mapperley Road, Nottingham.*
 Batchelor, W. Esq. 7, *Agnes Road, Northampton.*
 Black, Surgeon-Major W. G. F.R.C.S.E. 2, *George Square ; and
Caledonian United Service Club, Edinburgh.*
 Bliss, Rev. T. *Yockleton Rectory, Shrewsbury.*
 Brants, M. A. Esq. Ph.D. *Zelhem, near Doetinchem, Holland.*
 Brown, Rev. J. B. M.A. *Fenischiffe Vicarage, Blackburn.*
 Burke, Rev. R. G. M.A. LL.B. *Lilydale Melbourne.*
 Caldecott, Rev. Professor A. M.A. B.D. *Rectory, North and South
Lopham, Norfolk.*
 Clarke, Rev. J. M. M.A. *Drayton Rectory, Nuneaton.*
 Corbet, Frederick H. M. Esq. Barrister-at-Law, F.R.C.I. F.I.Inst.
 Hon. Executive Officer for Ceylon at the Imperial
 Institute, 42, *Kenilworth Avenue, Wimbledon.*
 Davis, Rev. W. B. M.A. *Ramsbury, Wilts.*
 Dixon, Prof. J. M. *Washington Univ. St. Louis, Mo. U.S.A.*
 Dorsey, Rev. J. Owen, Ethnologist, Bureau of Ethnology,
 Minister Prot. Epis. Ch. *Takoma Park, D.C. U.S.A.*
 East, Rev. H. E. *Leithfield, Christchurch, New Zealand.*
 †Eells, Rev. M., M.A. *Union City, Mason Co. Washington, D.C
U.S.A.*
 Finn, Alexander, Esq. *British Consulate, Chicago.*
 Fleming, Rev. T. S. F.R.G.S. *St. Clement's, Leeds (JF).*
 Foster, Harry S. Esq. J.P. F.R.G.S. Consul for Persia.
 Gissing, Rear-Admiral C. E. R.N. (ret.) F.R.G.S. *United Service
Club, S.W. ; 44, Chapel Park Road, St. Leonards-on-
Sea.*
 Gubbins, Surgeon-General W. L. M.D. Army Medical Staff, War
 Office, 18, *Victoria Street, S.W. ; St. John's, Worcester
Park, Surrey.*
 †Habershon, M. H. Esq. *Greenhead, Chapeltown, Sheffield.*
 Harris, A. H. Esq. c/o I.M. Customs, *Canton, China.*
 Harrison, Rev. A. J. B.D. LL.D. *Magdalen Lodge, North End,
Newcastle.*
 Hassell, Joseph, Esq. *Brittany Lodge, London Road, St.
Leonards.*
 Hetherington, Rev. J. *St. Peter's Vicarage, Hull.*
 Howard, Sir Frederick, J.P. *The Abbey Close, Bedford.*
 Hudson, Rev. Canon J. C. M.A. *Thornton Vicarage, Horn-
castle.*
 Hutchinson, Rev. A. B. *Fukuoka, Japan.*
 Irving, Rev. A. D.Sc. F.G.S. *Hockerill V. Bishop's Stortford.*
 Kydd, Robert, Esq. 164, *Stobcross Street, Glasgow.*

- McLeod, Rev. R. F. *North Fambridge Rectory, Essex.*
 Macpherson, Rev. A. C. M.A. *Shottery House, Beaufort Road, Clifton.*
 ¶Mello, Rev. J. M. M.A. F.G.S. *Mapperley V. Derby.*
 Nutt, Rev. George, *The Rectory, Lluidas Vale, Jamaica.*
 *Oates, Rev. W. *Somerset East, South Africa.*
 *O'Donel, G. H. Esq. *Mission School, Seoni Chappara, C.P. India.*
 Oliver, Rev. T. D.D. 118, *Hampton Road, Southport.*
 Painter, Rev. W. Hunt, *Stirchley Rectory, Shifnal, Salop.*
 ¶Parker, Prof. H. W. 47, *7th Avenue, New York, N.Y. U.S.A.*
 *Peet, Rev. Stephen D. Ph.D. Editor "American Antiquarian,"
 5817 *Madison Avenue, Chicago, Ill. U.S.A.*
 Petherick, Rev. G. W. B.A. *St. Bartholomew's Rectory, Salford, Manchester.*
 ¶Post, Rev. Prof. G. E. M.A. M.D. D.D.S. F.L.S. Surgeon
Johanniter Hosp. Syrian Protestant College, Beyrout.
 Postlethwaite, J. Esq. F.G.S. *Eskin Place, Keswick, Cumberland.*
 Ragg, Rev. F. W. M.A. *Marsworth Vicarage, Tring.*
 Redman, Rev. J. *Hyderabad, Sindh, India.*
 Richards, Rev. G. B. *Somercotes, Plympton, South Devon.*
 *Robertson, Rev. Alex. D.D. *Ca' Straun, Ponte Della Salute, Venice.*
 Ross, Rev. H. D.D. LL.D. F.C.S. Memb. R. Soc. of Arts of Port
Louis, Dallas House, Lancaster.
 Shipham, Rev. Arthur, *The Mound, Matlock Bridge.*
 Stefansson, Jon, Esq. Ph.D.
 Storrs, Rev. W. T. B.D. *Vicarage, Sandown, I.W.*
 †Taylor, Rev. Canon R. *St. Stephen's, Newtown, Sydney, N.S.W.*
 Thomas, Rev. James, British and Foreign Bible Society,
 146. *Queen Victoria Street, E.C.*
 ¶Tisdall, Rev. W. St. Clair, M.A. *Julfu, Isaphan, Persia.*
 Tomkins, Rev. H. G. *Park Lodge, Weston-super-Mare.*
 Tyndall, Mrs. *Colepark, Twickenham.*
 Walter, Rev. J. C. B.A. *Langton Rectory, Horncastle.*
 ¶Warring, C. B. Esq. M.A. Ph.D. *Poughkeepsie, N.Y. U.S.A.*
 Weidemann, Professor Alfred, Ph.D. 2, *König St. Bonn.*
 Whiteway, Rev. R. W. B. *Beulah House, Selby, Yorks.*
 Williams, W. Esq. Supt. Govt. Telegraphs, India (ret.), *Crofton, Combe Park, Bath.*
 Willis, R. N. Esq. M.B. 2, *Carlton Terrace, Rathmines, Dublin.*
 Willis, T. Gilbert, Esq. 4, *Kildare Street, Dublin.*
 Winslow, Rev. W. C. Ph.D. D.D. D.C.L. LL.D. D.Sc. 525, *Beacon Street, Boston, U.S.A.*
 Wright, Rev. C. H. H. D.D. T.C.D. M.A. Oxon. Ph.D. *Leipsic.*
Bampton Lecturer, 1878, Donnellan Lecturer, 1880-81,
 90, *Bolingbroke Grove, S.W.*
 Zwemer, Rev. S. M. M.A. D.D. F.R.G.S. *Bahrein, Persian Gulf.*

MISSIONARY ASSOCIATES.

Byrde, Rev. Louis, B.A. *Young Chow, S. China.*
Garrett, Rev. J. G. M.A. *Kandy, Ceylon.*
Joseland, Rev. Frank P. *Amoy, China.*
Moule, Rev. W. S. B.A. *Ningpo, China.*
Mylrea, Rev. C. Stanley G. M.D. *Bahrein, Arabia.*
Riggs, Rev. Charles T., *Bible House, Constantinople.*
Robinson, Miss L. G. *Berhampore, Bengal.*
Turner, Rev. G. Reynolds, M.B. *Hwei-an-hsein, S. China.*
Underwood, Dr. H. L. *Erzroom, Turkey.*
Woodley, Rev. E. C. *London Mission College, Calcutta.*

SOCIETIES EXCHANGING TRANSACTIONS WITH
THE INSTITUTE.

American Academy of Arts and Sciences.
 American Geographical Society.
 American Geological Society.
 American Philosophical Society.
 Anthropological Society, New York.
 Anthropological Society, Washington.
 Canadian Institute.
 Colonial Museum of New Zealand.
 Geographical Society of the Pacific.
 Geographical Society of California.
 Geological Society.
 Harvard Museum of Comp. Zoology.
 Manitoba Historical and Scientific Society.
 Michigan, Agricultural College of, U.S.
 New Zealand Institute.
 Nova Scotian Inst. of Natural Science.
 Royal Asiatic Society, Bombay.
 Royal Colonial Institute.
 Royal Dublin Society.
 Royal Geographical Society.
 Royal Institution.
 Royal Irish Academy.
 The Royal Society.
 Royal Society of Canada.
 Royal United Service Institution.
 Smithsonian Institution (Washington).
 Société Scientifique du Chili.
 Society of Arts.
 Society of Biblical Archæology.
 Society of Biblical Literature, U.S.
 Soc. Bib. Lit. and Exeg., Boston.
 Sydney Museum, New South Wales.
 Sydney Observatory, New South Wales.
 United States Bureau of Ethnology.
 United States Geological Survey.
 United States Government Geological and Geographical Survey.
 United States Government Reports.

OBJECTS, CONSTITUTION, AND BYE-LAWS

OF

The Victoria Institute,

OR

Philosophical Society of Great Britain.

Adopted at the First Annual General Meeting of the Members and Associates
May 27th, 1867, with Revisions of 1874-75.

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§ I. *Objects.*

1. THE VICTORIA INSTITUTE, or PHILOSOPHICAL SOCIETY OF GREAT BRITAIN, is established for the purpose of promoting the following objects, viz.:—

First. To investigate fully and impartially the most important questions of Philosophy and Science, but more especially those that bear upon the great truths revealed in Holy Scripture; with the view of reconciling any apparent discrepancies between Christianity and Science.

Second. To associate together men of Science and authors who have already been engaged in such investigations, and all others who may be interested in them, in order to strengthen their efforts by association; and, by bringing together the results of such labours, after full discussion, in the printed transactions of an Institution: to give greater force and influence to proofs and arguments which might be little known, or even disregarded, if put forward merely by individuals.

Third. To consider the mutual bearings of the various scientific conclusions arrived at in the several distinct branches into which Science is now divided, in order to get rid of contradictions and conflicting hypotheses, and thus promote the real advancement of true science; and to examine and discuss all supposed scientific results with reference to final causes, and the more comprehensive and fundamental principles of Philosophy proper, based upon faith in the existence of one Eternal God, who, in His wisdom, created all things very good.

Fourth. To publish Papers read before the Society in furtherance of the above objects, along with full reports of the discussions thereon, in the form of a Journal, or as the Transactions of the Institute.

Fifth. When subjects have been fully discussed, to make the results known by means of Lectures of a more popular kind, and to publish such Lectures.

Sixth. To publish English translations of important foreign works of real scientific and philosophical value, especially those bearing upon the relation between the Scriptures and Science; and to co-operate with other philosophical societies at home and abroad, which are now or may hereafter be formed, in the interest of Scriptural truth and of real science, and generally in furtherance of the objects of this Society.

Seventh. To found a Library and Reading Rooms for the use of the Members and Associates of the Institute, combining the principal advantages of a Literary Club.

§ II. *Constitution.*

1. The Society shall consist of Members and Associates, who in future shall be elected as hereinafter set forth.

2. The government of the Society shall be vested in a Council (whose Members shall be chosen from among the Members and Associates of the Society and be professedly Christians), consisting of a President, two or more (not exceeding seven) Vice-Presidents, a Treasurer, one or more Honorary Secretaries, and twelve or more (not exceeding twenty-four) Ordinary Members of Council, who shall be

elected at the Annual General Meeting of the Members and Associates of the Institute. But, in the interval between two Annual Meetings, vacancies in the Council may be filled up by the Council from among the Members of the Society; and the Members chosen as Trustees of the funds of the Institute shall be *ex officio* Members of Council.

3. Any person desirous of becoming a Member or Associate shall make application for admission by subscribing the Form A of the Appendix, which must be signed by two Members of the Institute, or by a Member of Council, recommending the candidate for admission as a Member; or by any one Member of the Institute, for admission as an Associate.

4. Upon such application being transmitted to one of the Secretaries, the candidate for admission may be elected by the Council, and enrolled as a Member or Associate of the Victoria Institute, in such manner as the Council may deem proper; having recourse to a ballot, if thought necessary, as regards the election of Members; in which case no person shall be considered as elected unless he have three-fourths of the votes in his favour.

5. Application for admission to join the Institute being thus made by subscribing Form A, as before prescribed, such application shall be considered as *ipso facto* pledging all who are thereupon admitted as Members or Associates to observe the Rules and Bye-Laws of the Society, and as indicative of their desire and intention to further its objects and interests; and it is also to be understood that only such as are professedly Christians are entitled to become *Members*.

6. Each Member shall pay an Entrance Fee of One Guinea and an Annual Contribution of Two Guineas. A Donation of Twenty Guineas shall constitute the donor a Life Member.

7. Each Associate shall pay an Annual Contribution of One Guinea. A donation of Ten Guineas shall constitute the donor a Life Associate.

8. The Annual Contributions shall be considered as due in advance on the 1st day of January in each year, and shall be paid within three months after that date; or, in the case of new admissions within three months after election.

9. Any Member or Associate who contributes a donation in one sum of not less than Sixty Guineas to the funds of the Institute shall be

enrolled as a Vice-Patron thereof, and will thus also become a Life Member or Life Associate, as the case may be.

10. Should any member of the Royal Family hereafter become the Patron, or a Vice-Patron, or Member of the Institute, the connexion shall be regarded as purely Honorary; and none of the Rules and By-Laws relating to donations, annual contributions or obligations to serve in any office of the Society, shall be considered as applicable to such personages of Royal Blood.

11. Any Member or Associate may withdraw from the Society at any time, by signifying a desire to do so by letter, addressed to one of the Secretaries; but such shall be liable for the contribution of the current year, and shall continue liable for the annual contribution, until all sums due to the Society from such Member or Associate shall have been paid, and all books or other property borrowed from the Society shall have been returned or replaced.

12. Should there appear cause, in the opinion of the Council, for the exclusion from the Society of any Member or Associate, a private intimation may be made by direction of the Council, in order to give such Member or Associate an opportunity of withdrawing from the Society; but, if deemed necessary by the Council, a Special General Meeting of Members shall be called for the purpose of considering the propriety of expelling any such person: whereat, if eleven or more Members shall ballot, and a majority of those balloting shall vote that such person be expelled, he shall be expelled accordingly. One month's notice, at least, shall be given to the Members of any such Special General Meeting.

13. Non-resident Members and Associates, or others desirous of promoting the objects and interests of the Institute, may be elected by the Council to act as corresponding Members abroad, or as Honorary Local Secretaries, if within the United Kingdom, under such arrangements as the Council may deem advisable.

14. The whole property and effects of the Society shall be vested in two or more Trustees, who shall be chosen at a General Meeting of the Society. The Trustees are empowered to invest such sums as the Council may, from time to time, place in their hands, in, or upon any of the Stocks, Funds, or Securities, for the time being, authorised by statute for the investment of trust funds by trustees, and shall have the usual powers of trustees in regard thereto. [The President, Hon. Treasurer, and Hon.

Secretary may officially give effect to such resolutions as a General Meeting may pass in regard thereto.]

14a. All moneys received on account of the Institute shall be duly paid to its credit at the Bankers, and all cheques shall be drawn, under authority of the Council, and shall be signed by the Honorary Treasurer and Honorary Secretary.

15. The accounts shall be audited annually, by a Committee, consisting of two Members,—one of whom may be on the Council,—to be elected at an Ordinary Meeting of the Society preceding the Anniversary Meeting. This Committee shall make a written Report to the Council at the first Meeting after such audit, and also to the Institute, upon the day of the Annual General Meeting,—stating the balance in the Treasurer's hands and the general state of the funds of the Institute.

16. Both Members and Associates shall have the right to be present to state their opinion, and to vote by show of hands at all General and Ordinary Meetings of the Society; but Members only shall be entitled to vote by ballot, when a ballot is taken in order to determine any question at a General Meeting.

§ III. *Bye-Laws* (Privileges).

1. A Member or Associate, when elected, shall be so informed by the Secretary in a printed copy of the letters, Form B, in the Appendix.

2. Members and Associates shall not be entitled to any privileges, or have the right to be present, or to vote at any of the Meetings of the Society, till they have paid the contributions due by them.

3. Annual subscriptions shall be considered as in arrear, if not paid on or before 31st March in each year, or within three months after election, as the case may be.

4. Should any annual subscription remain in arrear to the 30th June, or for six months after election, the Treasurer shall cause to be forwarded to the Member or Associate from whom the subscription is due, a letter, Form D, in the Appendix, unless such Member or Associate reside out of the United Kingdom; in which case the Form D shall not be sent unless the subscription continues unpaid till the 30th September.

5. If any arrears be not paid within twelve months, the Council shall

use their discretion in erasing the name of the defaulter from the list of Members or Associates.

6. Members shall be entitled to introduce two Visitors at the Ordinary Meetings of the Society; and to have sent to them a copy of all the Papers read before the Society, which may be printed in its Transactions or otherwise, and of all other official documents which the Council may cause to be printed for the Society; they will also be entitled to a copy of all such translations of foreign works or other books as are published under the auspices of the Society in furtherance of Object 6 (§ I.).

7. Associates may introduce two Visitors at the Ordinary Meetings, and shall be entitled to all the minor publications of the Society, and to a copy of its Transactions during the period of their being Associates, but not to the translations of foreign works or other books above referred to.* It shall, however, be competent to the Council of the Society, when its funds will admit of it, to issue the other publications of the Society to Associates, being ministers of religion, either gratuitously or at as small a charge as the Council may deem proper.

8. When it shall be found necessary to send the letter, Form D, to any Member or Associate who may be in arrear, the printed papers and other publications of the Society shall cease to be sent to such Member or Associate till the arrears are paid; and, until then, he shall not be allowed to attend any Meeting of the Society, nor have access to any public rooms which may be in its occupation.

9. The Library† shall be under the management and direction of the Council, who are empowered to designate such works as shall not be allowed to circulate.

10. Each Member‡ shall be allowed to borrow books from the Library, and to have not more than three volumes in his possession at the same time; pamphlets and periodical publications not to be kept above fourteen days, nor any other book above three weeks.

11. Members who may borrow books from the Library shall be answerable for the full value of any work that is lost or injured.

* These, as well as the Transactions issued in the years previous to their joining, may be purchased at half price.

† For the use of Members and Associates.—*See 7th Object.*

‡ Members only are allowed to take books away.

12. Periodical publications shall remain on the table for a month, other books for a fortnight, after they are received.

13. When a book or pamphlet is wanted, and has been the stipulated time in the possession of any Member, the Secretary shall request its return, and a fine of threepence a day shall be incurred for every day it may be detained, which fine shall commence on the third day after the transmission of the notice in the case of town Members, and after the sixth day in the case of country Members ; and until the return of such works, and the discharge of all fines incurred, no further issue of books shall be permitted to the Member applied to.

14. The books shall be ordered in for inspection at such times as the Council shall appoint, and a fine of half-a-crown shall be incurred for neglecting to send in books by the time required in the notice.

15. A book shall lie on the Library table in which Members may insert, for the consideration of the Council, the titles of such works as they desire to be purchased for the Institute.

§ IV. *Bye-Laws* (General, Ordinary, and Intermediate Meeting).

1. A General Meeting of Members and Associates shall be held annually on 24th May (being Her late Majesty's birthday, and the Society's anniversary), or on the Monday following, or on such other day as the Council may determine as most convenient, to receive the Report of the Council on the state of the Society, and to deliberate thereon ; and to discuss and determine such matters as may be brought forward relative to the affairs of the Society ; also, to elect the Council and Officers for the ensuing year.

2. The Council shall call a Special General Meeting of the Members and Associates, when it seems to them necessary, or when required to do so by requisition, signed by not less than ten Members and Associates, specifying the question intended to be submitted to such Meeting. Two weeks' notice must be given of any such Special General Meeting ; and only the subjects of which notice has been given shall be discussed thereat.

3. The Ordinary Meetings of the Society shall usually be held on the first and the Intermediate Meetings on the third Monday evenings in each month, from November to June inclusive or on such other evenings

as the Council may determine to be convenient : and a printed card of the Meetings for each Session shall be forwarded to each Member and Associate.

4. At the Ordinary and Intermediate Meetings the order of proceeding shall be as follows : The President, or one of the Vice-Presidents, or a Member of the Council, shall take the chair at 4.30 o'clock precisely, the minutes of the last Ordinary or Intermediate Meeting shall be read aloud by one of the Secretaries, and, if found correct, shall be signed by the Chairman ; the names of new Members and Associates shall be read ; the presents made to the Society since their last Meeting shall be announced ; and any other communications which the Council think desirable shall be made to the Meeting. After which, the Paper or Papers intended for the evening's discussion shall be announced and read, and the persons present shall be invited by the Chairman to make any observations thereon which they may wish to offer.

The claims of Members and Associates to take part in a discussion are prior to those of Visitors. The latter when desiring to speak upon any Paper, must first send their cards to the Chairman and ask permission (unless they have been specially invited by the Council "to attend, and join in considering the subject before the Meeting," or are called upon by the Chairman). 1875.

5. The Papers read before the Society, and the discussions thereon, fully reported, shall be printed by order of the Council ; or, if not, the Council shall, if they see fit, state the grounds upon which this Rule has been departed from, in the printed Journal or Transactions of the Society.

6. The Council may at their discretion authorise Papers of a general kind to be read at any of the Ordinary or Intermediate Meetings, either as introductory lectures upon subjects proper to be afterwards discussed, or as the results of discussions which have taken place, in furtherance of the 5th Object of the Society (§ I.).

7. With respect to Intermediate Meetings, the Papers read at which are not necessarily printed nor the discussions reported,* the Council at its discretion may request any lecturer or author of a Paper to be read thereat, previously to submit an outline of the proposed method of treating his subject.

* So arranged when the "Intermediate Meetings" were commenced, 16th January, 1871.

8. At the Ordinary or Intermediate Meetings no question relating to the Rules or General Management of the affairs of the Society shall be introduced, discussed or determined.

§ V. *Bye-Laws* (Council Meetings).

1. The Council shall meet at least once every month from November to June inclusive, or at any other time and on such days as they may deem expedient. The President, or any three Members of the Council, may at any time call a Special Meeting, to which the whole Council shall be summoned.

2. At Council Meetings three shall be a quorum ; the decision of the majority shall be considered as the decision of the Meeting, and the Chairman shall have a casting vote.

3. Minutes of the Proceedings shall be taken by one of the Secretaries, or, in case of his absence, by some other Member present, whom the Chairman may appoint ; which Minutes shall afterwards be entered in a minute-book kept for that purpose, and read at the next Meeting of the Council, when, if found correct, they shall be signed by the Chairman.

§ VI. *Bye-Laws* (Papers).

1. Papers presented to be read before the Society shall, when read, be considered as the property of the Society, unless there shall have been any previous engagement with its author to the contrary ; and the Council may cause the same to be published in any way and at any time : they may think proper after having been read. If a Paper be not read, it shall be returned to the author ; and, if a Paper be not published within a reasonable time after having been read, the author shall be entitled himself to publish it, and he may borrow it for that purpose.

2. When a Paper is sent to the Society for the purpose of being read, it shall be laid before the Council, who shall refer it to two of that body, or of the other Members or Associates of the Society whom they may select, for their opinions as to the character of the Paper and its fitness or otherwise for being read before the Society, which they shall state as briefly as may be, in writing, along with the grounds of their respective opinions. Should one of such opinions be adverse to the Paper and against its being read before the Society, then it shall be referred to some other referee, who is unaware of the opinion already pronounced upon the Paper, in order that he may state his opinion upon it in like manner. Should this opinion be adverse to the Paper, the Council shall then

consult and decide whether the Paper shall be rejected or read ; and, if rejected, the Paper shall be returned to the author with an intimation of the purport of the adverse opinions which have been given with respect to it ; but the names of the referees are not to be communicated to him, unless with their consent or by order of the Council. All such references and communications are to be regarded as confidential, except in so far as the Council may please to direct otherwise.

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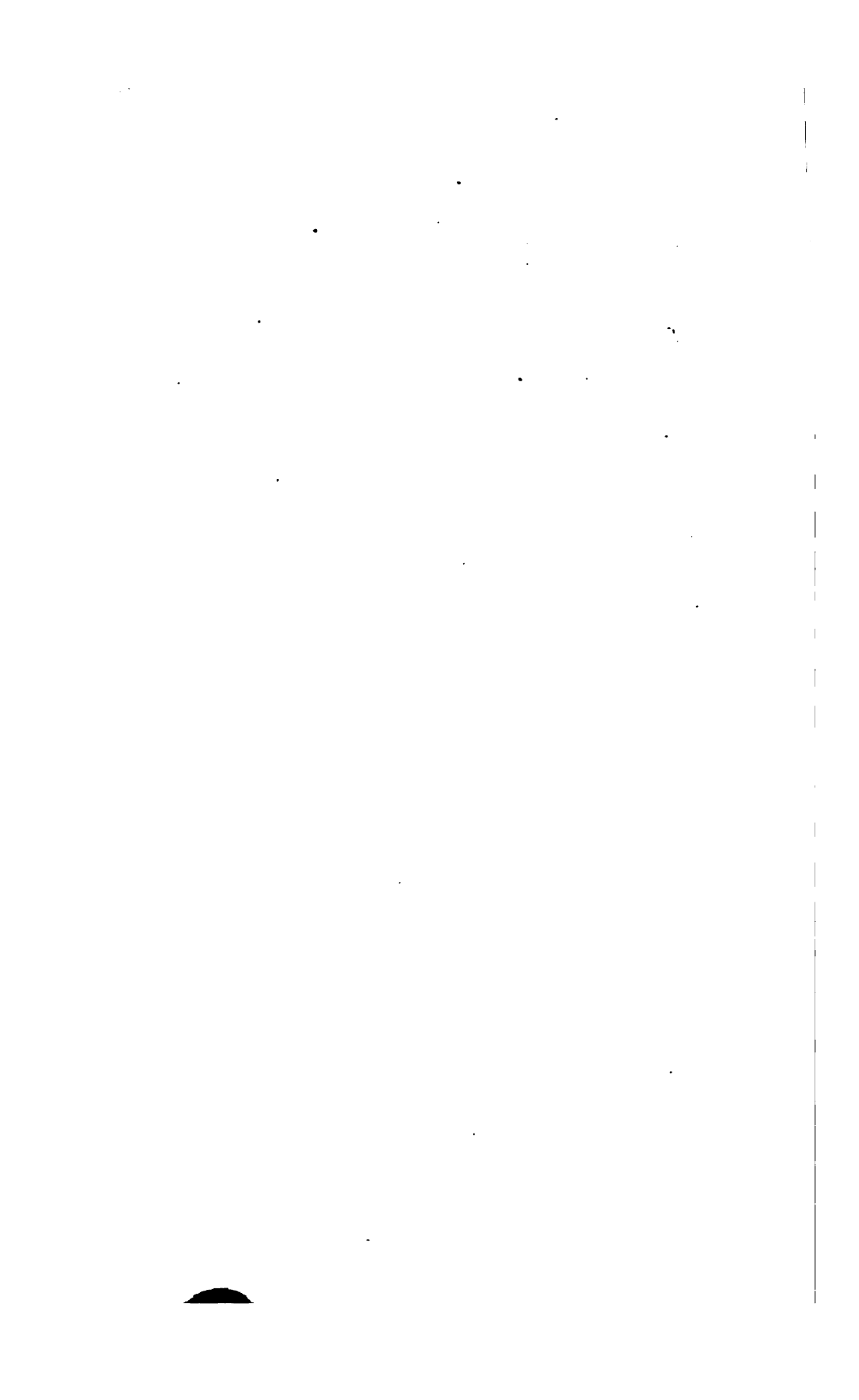
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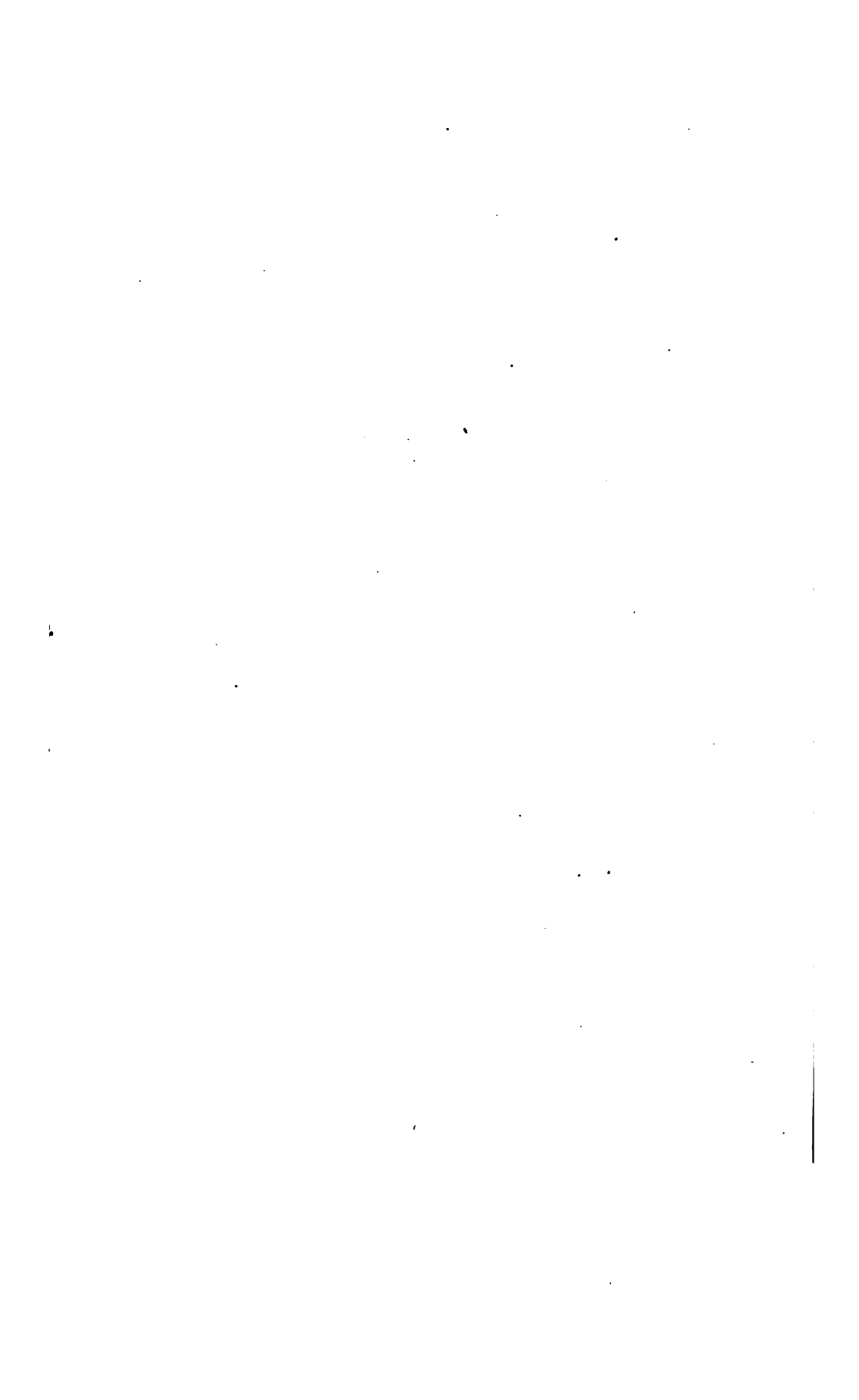
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